# FOOD MANUFACTURE

*Incorporating Food Industries Weekly*

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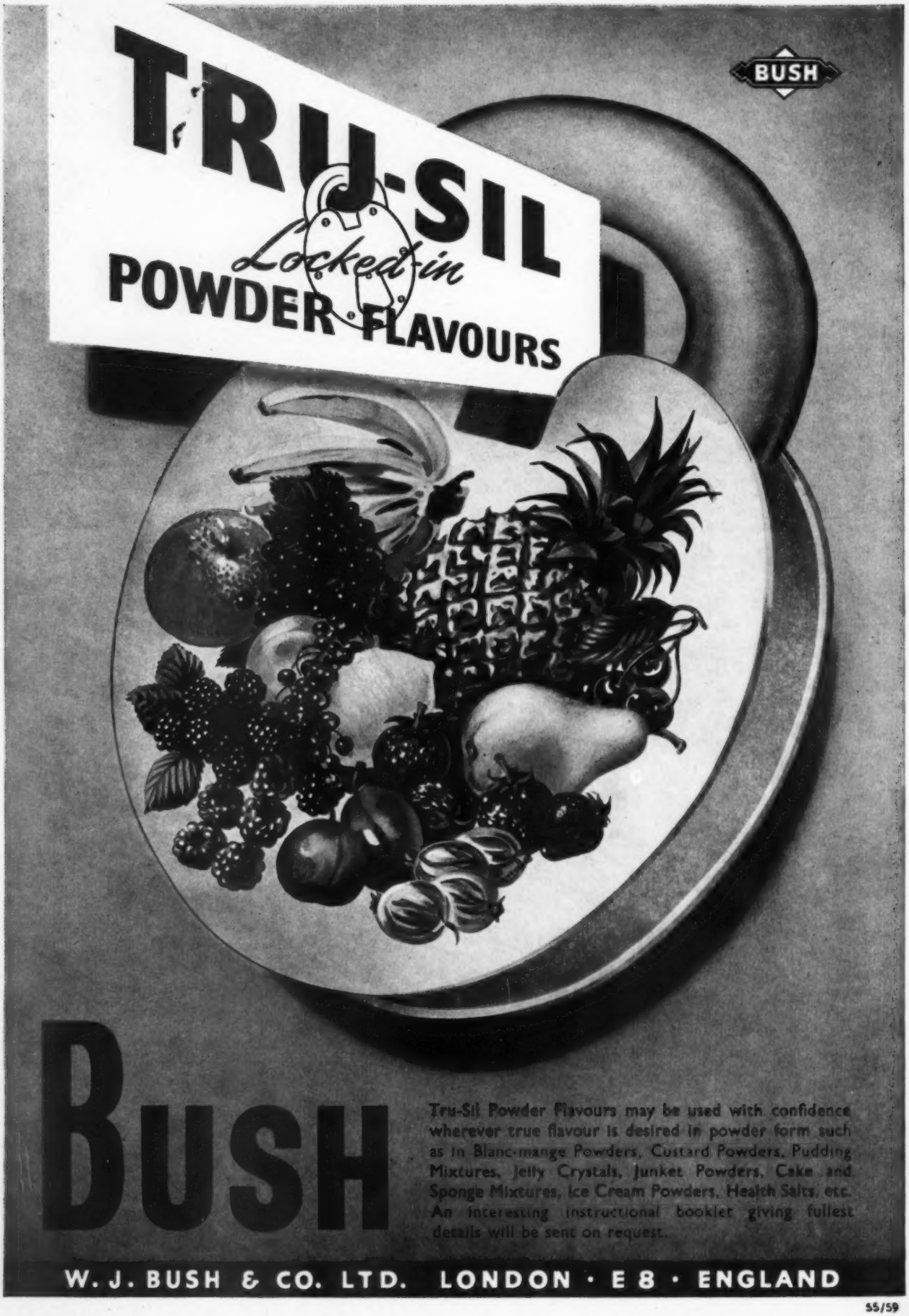
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55/59

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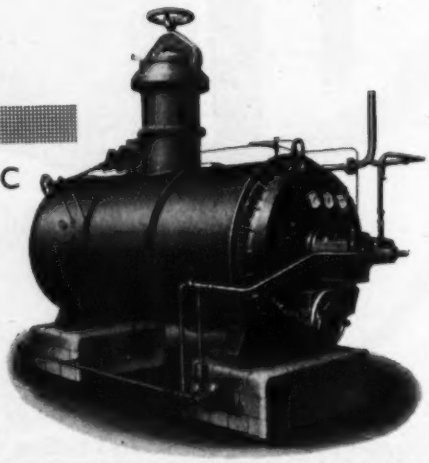
Strömmen

A

C



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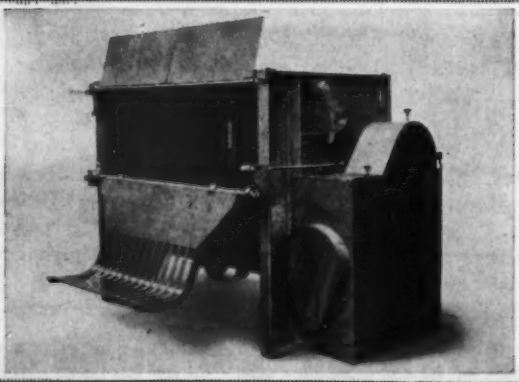
*C.—Strömmen SUPER Dry Melter. Exceptionally speedy process. Steam heated agitator and shaft. Large filling hopper. Eliminates bone crusher. Minimises cutting work. A first-class product.*

B



**THE ALEXANDRA SEPARATOR CO. LTD.**

TELEPHONES TERMINUS 5138

**25, PANCRAS RD. KING'S CROSS LONDON, N.W.1.**

The Confused flour beetle, *Tribolium confusum*, is a common pest in mills, bakeries, cereal and biscuit factories. At mill and bakery temperatures there may be as many as five generations in a year. Only prompt measures, therefore, can prevent serious infestation and loss. Spraying with an appropriate " Pybuthrin " insecticide is the safest and most effective answer. Containing African pyrethrum synergised with piperonyl butoxide, " Pybuthrin " is completely safe to use wherever cereals or other foodstuffs are processed or stored, and is the basis of a new range of potent, non-poisonous Cooper insecticides. If you have an insect problem in your premises, write for free advice and further information about " Pybuthrin " insecticides.

COOPER, McDOUGALL
& ROBERTSON LTD.,
BERKHAMSTED, HERTS.
EST'D 1843

**PYBUTHRIN** INSECTICIDES

*Incl.*

# The Butcher Meets Cockade

COCKADE is in his cornet: to put the *cream* in ice-cream. Hence very good ice-cream. Because Cockade is very good milk powder indeed. Fact is, it's already used by firms with famous names for ice-cream, soups, for chocolates, for quality.

FISONS MILK PRODUCTS LTD., LOUGHBOROUGH LEICESTERSHIRE

*Like to know more about Cockade? Send in our coupon before the ice-cream melts!*

*TO FISONS MILK PRODUCTS LTD., LOUGHBOROUGH · LEICESTERSHIRE.*

*NAME* .....

*ADDRESS* .....

.....

(FM/2)

**Cockade** BRAND MILK POWDERS

*You can't afford to ignore the economies of using*

# DE LAVAL

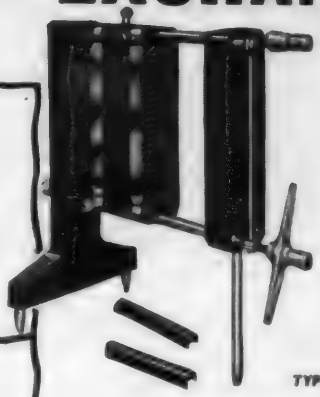
# PLATE HEAT EXCHANGERS

**OVER 200 BREWERIES use DE LAVAL HEAT EXCHANGERS for**

Cooling wort
Beer chilling
Beer Pasteurisation
Return Beer Pasteurisation
Sugar Primings cooling and heating

**OVER 100 YEAST FACTORIES AND DISTILLERIES use DE LAVAL for**

Pasteurising and Cooling Molasses
Cooling of Yeast Cream
Cooling of Spent Wash
Continuous Cooling of fermented wort
Recovery of heat



TYPE P5EB

PROFILE OF PLATES

*Special features of*
**DE LAVAL HEAT EXCHANGERS**

★ Sturdy heavy guage stainless plates
★ Deep gasket grooves, giving leak proof operation at high pressures
★ Easily and quickly cleaned without dismantling

P15 FOR HIGH CAPACITIES AND PRESSURES

**FISH OIL—VEGETABLE OIL AND MARGARINE FACTORIES use DE LAVAL for**

Glue water heating before separation and cooling after separation—Heating vegetable oil in refineries—Cooling deodorised and hardened oils—Sterilising reconstituted and fresh milk—Pasteurising margarine

**also for**

Pasteurising fruit juices and wine—Cooling vinegar wort and heating vinegar—Heating and cooling gelatine—Heating starch milk—Cooling Protein slurry—Condensing and cooling distillate—Pre-heating still feeds—Heating and cooling viscose—Cooling waste sulphite liquor—Pasteurising penicillin media Etc Etc

***UNSURPASSED FOR HEAT TRANSFER EFFICIENCY***

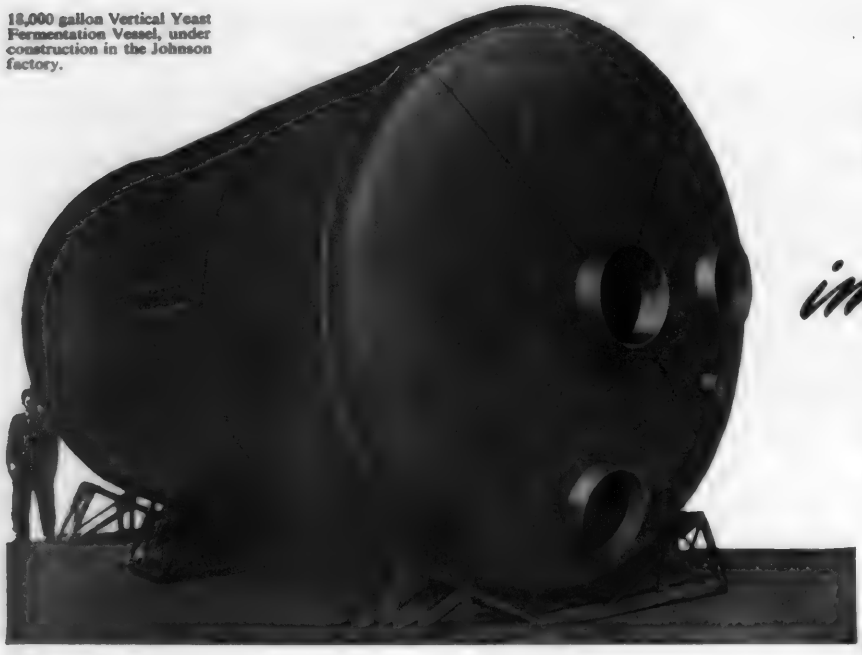
One factory now saves 3 tons/hour of coal since installing De Laval

*Write for complete details to Process Engineering Division*

**ALFA-LAVAL CO., LTD. · GREAT WEST ROAD · BRENTFORD · MIDDLESEX**

Smee's DL 323

18,000 gallon Vertical Yeast Fermentation Vessel, under construction in the Johnson factory.



# *Product improvement PAYS!..*

## . . . SO DOES MODERN PLANT IN . . . HYGIENIC STAINLESS STEEL . . .

JOHNSON'S equipment for Food Processing means factory modernisation, efficient production, hygienic handling. Designed for simplicity—constructed for reliable operation—plant by Johnson's pays dividends. Whatever your requirements—from a simple tank to an automatic mixer—Johnson's can fabricate in any of the non-contaminating metals specially for ***you***. Discuss your process plant problems with Johnson's first—there is no obligation.

CA/100 Steam Jacketed Jilting Boiling Pan with 3-speed contra-rotating agitation.

Stainless Steel Stationary Boiling Pan.

**STAINLESS STEEL BUCKETS** produced from a single-piece spinning without seams. Turned edges, strip handles with crevice-free attachment. With or without skirt band.

Johnson's

**A. JOHNSON & CO. (LONDON) LTD**

*Works & Sales Office:* **DUKES ROAD, WESTERN AVENUE, ACTON, W.3** *Telephone:* **ACORN 6061**

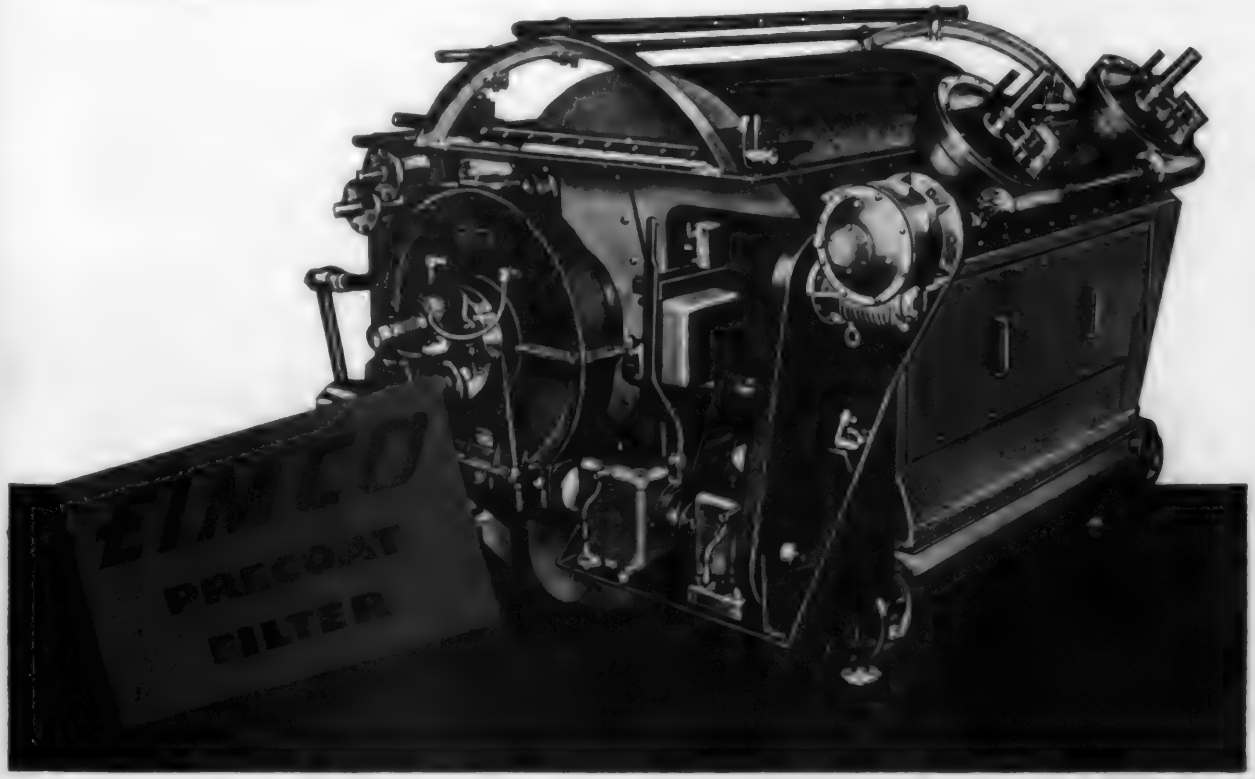
*Telegrams:* **AGENTICUM Telex London** *Head Office:* **AFRICA HOUSE, KINGSWAY, LONDON, W.C.2**

# Marchon Products Ltd choose EIMCO filters

One 75 sq. ft. EIMCO Precoat filter is already in operation at Solway whilst a further EIMCO filter is to be installed shortly.

Slimes and colloids CAN be removed to give a crystal-clear filtrate if you use an Eimco Precoat Drum Filter. The filter medium is a coat of diatomaceous earth. An advancing knife shaves the precoat to expose a fresh surface to the slurry each revolution.

Blinding of the filter medium is therefore overcome. Have you a problem involving the removal of slimes or colloids? If so, why not consult us? Our testing facilities and world-wide experience are at your disposal.




EIMCO (GREAT BRITAIN) LTD. TEAM VALLEY, GATESHEAD-ON-TYNE. Tel.: Low Fell 7-7241
LONDON OFFICE: PRINCE'S HOUSE, PICCADILLY, LONDON, W.1. Tel.: Grosvenor 2184

# Have you asked LACY-HULBERT?

*SEE THEM*
*about the latest*
**J2A**
**VACUUM PUMP**

The J2A is a vertical, double-acting, air-cooled vacuum pump with a displacement of 200 cu. ft. per min., and occupying less than 3½ sq. ft. floor space.

Where it is required to handle vapours which may result in corrosive or gummy condensate, the J2A is ideally suited for the purpose as the cylinder is isolated from the running gear, which itself is lubricated by means of a force-feed gear pump.

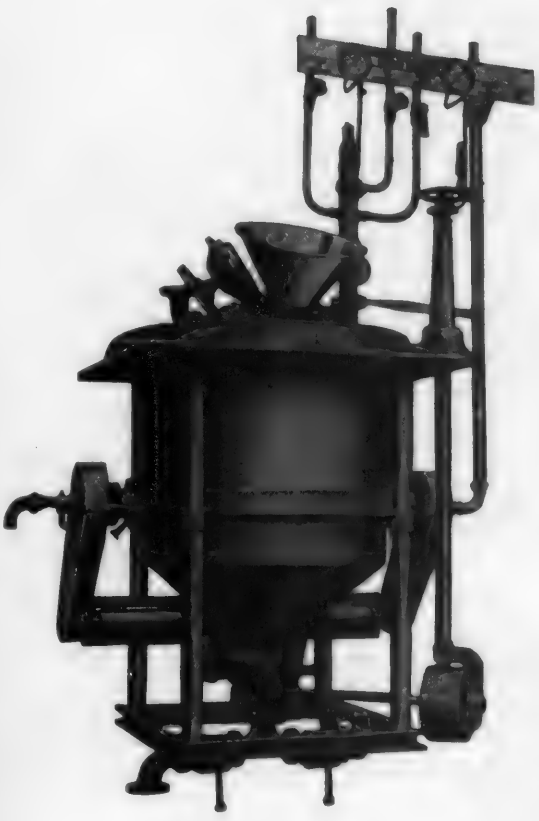
*When ordering or writing for leaflet please state application and quote Ref.* J2A/3.

LACY-HULBERT & Co. Ltd.
BOREAS WORKS · BEDDINGTON · CROYDON
PNEUMATIC ENGINEERS — ESTABLISHED 1901
TELEGRAMS "PERCUSSIVE, CROYDON" TELEPHONE CROYDON 5504/7

# they have the pneumatic 'know-how'!

# Kellie Announces

## New all purpose Autoclave



**FOR PROCESSING FRUIT PULPS, JAMS, JELLIES, JUICES WITH STEAM AND COMPRESSED AIR OR STEAM AND VACUUM ARRANGEMENTS**

***Patent No. 684357, other patents pending***

**No steam jacket is employed, there is no local overheating or skin burning of the product, no pitting or erosion.**
**NO METALLIC CONTENT IN THE FINISHED PRODUCT**

**Processing is by patent steam heated Revolving Calandria**

**The Calandria incorporates a Swash Plate Impeller**

**The rotating movement of the Calandria continually cleans the heating elements**

**The ratio of the rotating heating surface to volume is 50 per cent greater than that of a steam jacketed Autoclave resulting in greatly increased production**

**When operating as a batch fruit pulping unit added water content is controlled at a predetermined figure**

**Designed to supersede steam jacketed vessels of all types, this all purpose unit achieves results which from the point of view of economy, efficiency and quality of product cannot be equalled.**

KELLIE

## KELLIE for FOOD PLANT

*Write today for further particulars to:*

**ROBERT KELLIE & SON LIMITED DUNDEE SCOTLAND**

*Telephone: Dundee 2819 (2 lines)*

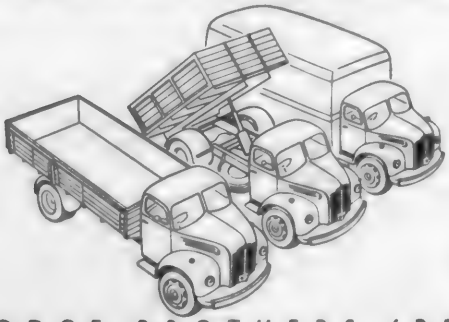
*Telegraphic and Cable address: "Kellie" Dundee . Code A.B.C. (5th Edn).*

# IT'S DEPENDABLE..IT'S DURABLE..IT'S A DODGE!

## the truck that's right for your job!

MORE AND MORE business firms are finding in the Dodge truck the answer to their transport problems. They have learned from experience that it's earning power and not initial cost which is the essential consideration when buying a new truck. And a Dodge with its greater capacity for hard work and ability to go on and on giving day in, day out, dependability with minimum upkeep has enabled them to cut their hauling costs.

Whatever the load, whatever the task, there is a petrol or diesel model in the Dodge range which can fulfil your transport needs and save you money in just the same way. See your nearest Distributor or Dealer and judge for yourself. A fair and factual appraisal will convince you that a Dodge excels in overall value.



KEW DODGE

MODELS FROM 2 TO 8 TONS • PETROL AND DIESEL

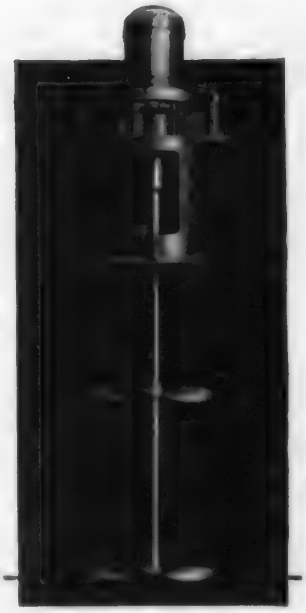
DODGE BROTHERS (BRITAIN) LIMITED · KEW · SURREY

# Mitchells

## make good MIXERS

*Type GA fluid mixer for medium speed mixing of semi-viscous fluids and where gentle agitation is required.*

*Type AD fluid agitator for high speed mixing of free-flowing solutions.*



*Type GVD permanently mounted geared fluid agitator for heavy duties.*

**To the Foodstuffs Industry we can supply a wide range of fluid agitating equipment for sugar syrups, sauces, soups, brine solutions for canning, essences, flavourings, aerated waters, marshmallow creams, etc.**

**As Fluid Agitation Specialists we have the experience and "know-how" to give you the best advice on your fluid mixing problems, whether in the laboratory or on large production scale.**

MITCHELL FLUID MIXER SPECIALISTS

**L. A. MITCHELL LTD. • 37 PETER ST. • MANCHESTER 2**

*Telephone: BLAckfriars 7224 (4 lines)*

Mx. 68

**EDWIN DANKS**

# SPECIAL VESSELS

## FOR EVERY INDUSTRIAL PROCESS

*including:*

**VULCANIZERS**

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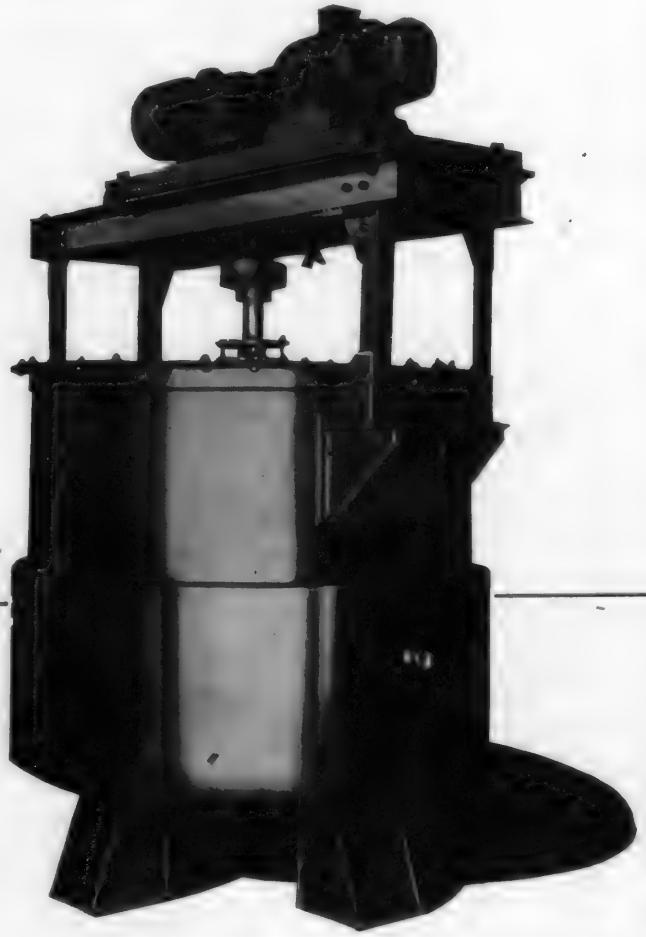
**VERTICAL AND HORIZONTAL MIXERS**

**REVOLVING KIERS**

**HARDENING CYLINDERS**

**HEAT EXCHANGERS**



The illustration shows a Steam Jacketed Mixing Pan 4′ 6″ diameter by 5′ 0″ deep, fitted with stirrer gear operated by electric motor and reduction gear. This type of mixing pan can be made in any size to satisfy special requirements and working conditions. Vessels of the same design are supplied with or without steam jacket, or, alternatively, fitted with internal steam coils.

Manufactured in mild steel, stainless steel or mild steel with integrally clad material of stainless steel or monel.

OTHER MANUFACTURES:
Edwin Danks High Velocity Economic Boilers and all other types of Shell Boilers, complete Boiler House Installations, "Oldbury" Chain Grate Stokers, Structural Steel-work.

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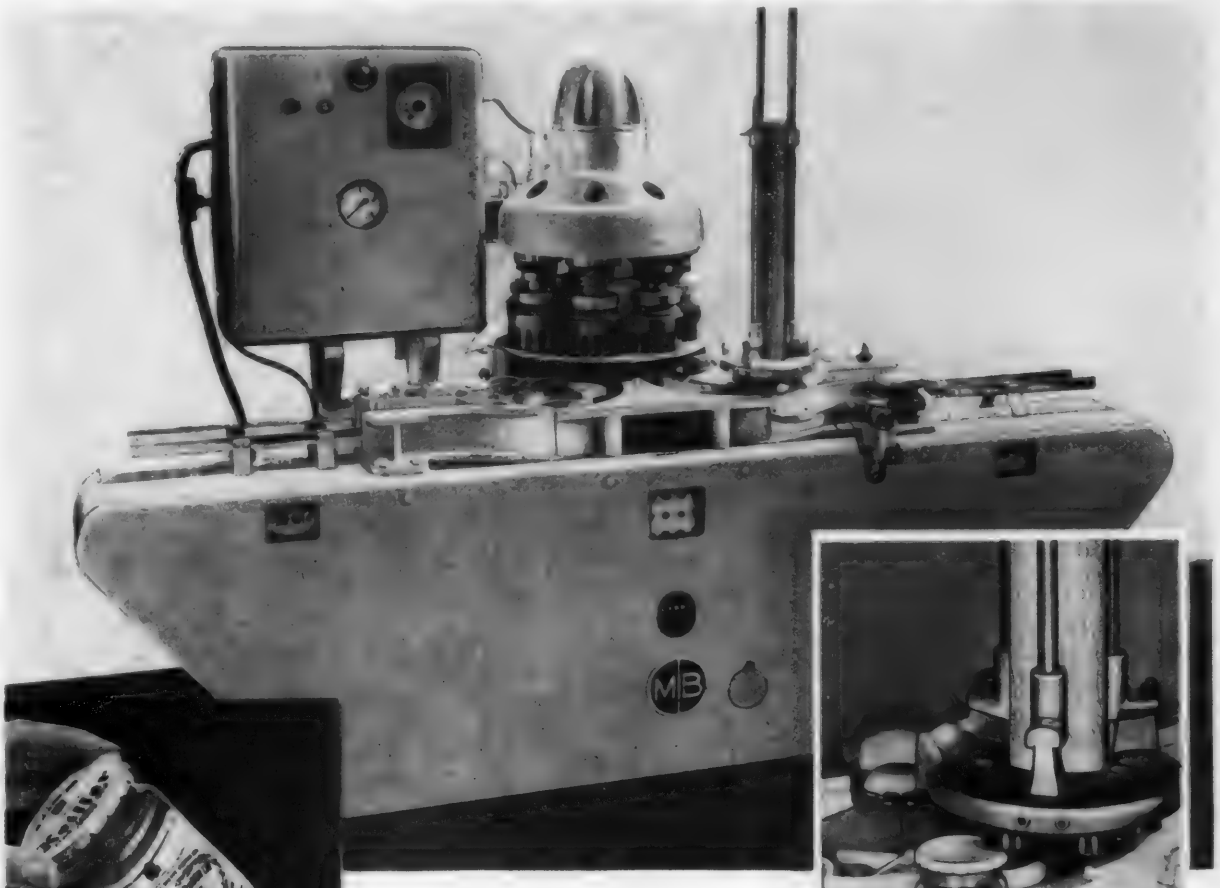
OLDBURY NEAR BIRMINGHAM

*Telephones: Main Works, Broadwell 1381-6; Stoker Division, Brierley Hill 7731*

LONDON · CARDIFF · MANCHESTER · LEEDS · NEWCASTLE · GLASGOW

# Cheaper filling with the GARDA CAP



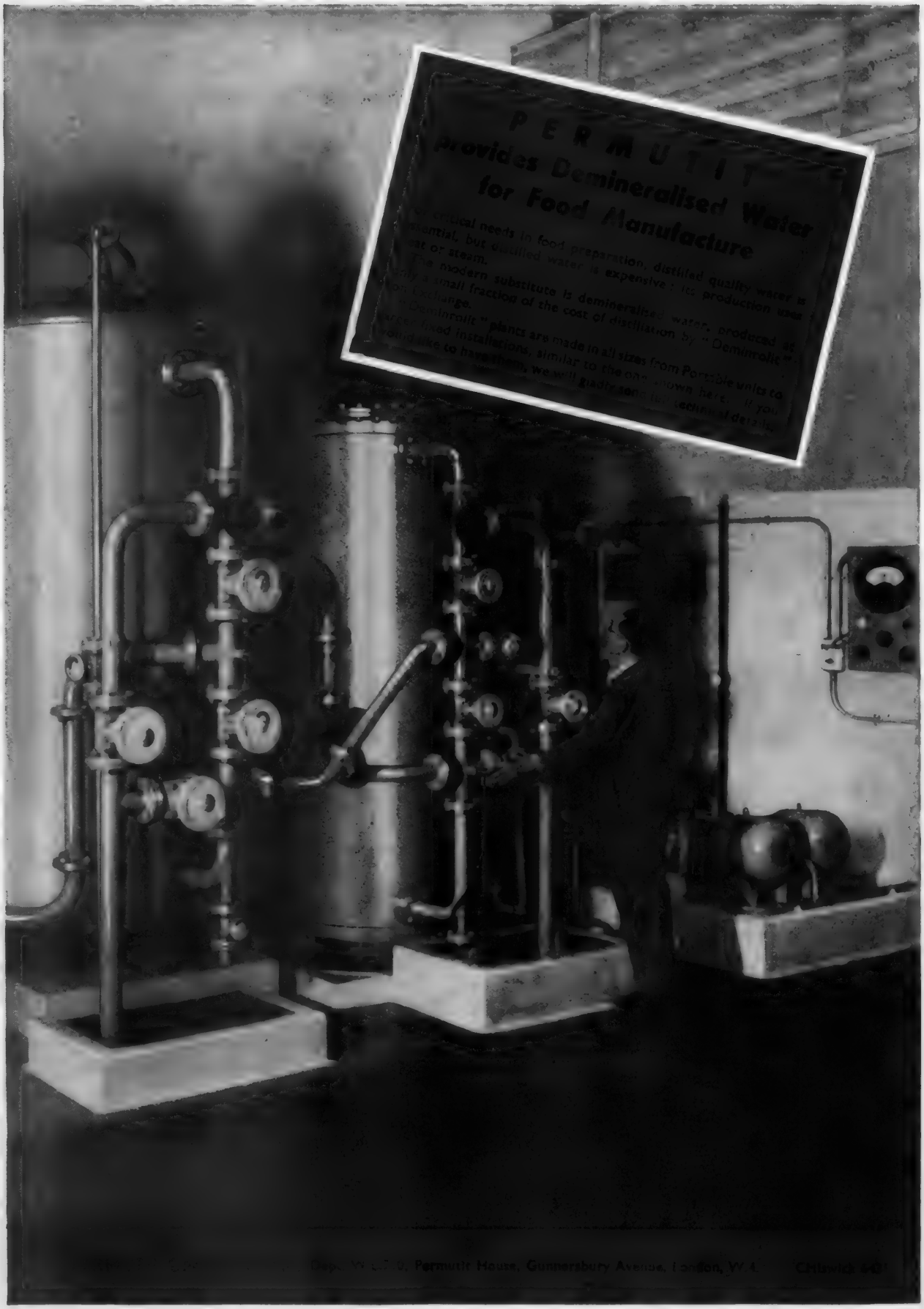
The Garda is a standard vacuum cap used mainly (but not wholly) for packing hot filled preserves. Now the Metal Box Cap Group has developed an invaluable addition to the normal range of Garda Cap machinery. This is an automatic Garda Cap feed which replaces capping by hand, speeds up the capping process and consequently lowers packing costs. This unit demonstrates how new aids or accessories can extend the use and increase the efficiency of standard caps. It exemplifies too the constant quest of the Metal Box Cap Group for devices and ideas to improve the efficiency of their customers' standard closures. Please do not hesitate to make use of their services in this respect.

**THE METAL BOX COMPANY LIMITED**

Metal Containers · Paper Products · Flexible Packages · Plastic Films and Laminates

**The Langham · Portland Place · London W.1**

MB 3794


PERMUTIT
Provides Demineralised Water
for Food Manufacture

# "CELLOPHANE" PUTS FOOD IN ITS PLACE... in the shopper's basket!

At the present rate of progress, the bulk of the Nation's foodstuffs will eventually reach the shopper's basket in pre-packaged form.

A survey showed that 87% of shoppers' impressions are controlled by sight and this is your best card to play in the Pre-packaging Era!

"Cellophane" gives strong and flexible packs, more transparent than window glass. Customers can see *every* detail of *every* batch of your product. Where nothing is hidden, confidence is created . . . and pre-packaging is off to the best possible start!

## SEEN . . . . . AND SEEN FRESH

All types of "Cellophane" are impervious to dust and grease. All non-coloured moistureproof types of "Cellophane" have an ANCHORED coating which moisture cannot shift. Foodstuffs are not only *seen* in "Cellophane" they are seen protected and *FRESH*.

**B.C.L. FILM ADVISORY SERVICES**

Await Your Use Without Obligation . . . For The Better Film-Packaging Of Your Products.

**DESIGN, ART WORK, HIGH-QUALITY PRINTING AND BAG-MAKING**

Colodense Ltd., an associate of British Cellophane Ltd., supplies film as reels, wrappers and bags with brilliant multi-colour printing, as well as plain bags of all types for the pre-packaging of foodstuffs.

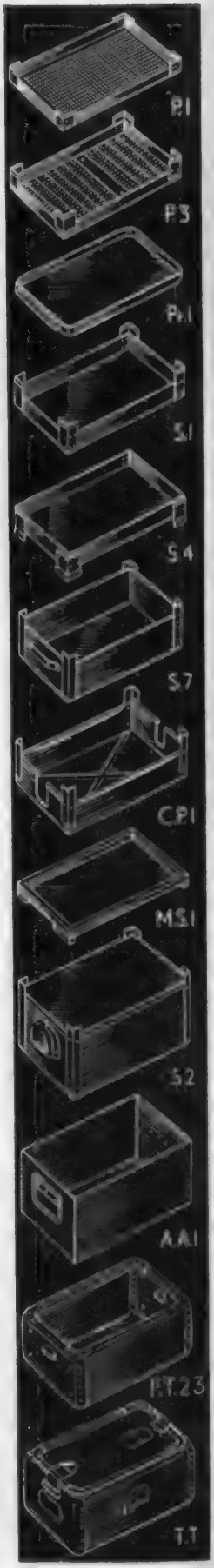
**"CELLOPHANE"—the first packaging film—and the greatest!**

*CONSULT US TODAY*

**BRITISH CELLOPHANE LIMITED**

Commercial Offices: 12/13 Conduit Street, London, W.1
Reg. Offices & Factory: Bath Road, Bridgwater, Somerset

"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them




# HYGIENIC LIGHT
## INTERSTACKING

These boxes with snug fitting, drop-on lids give secure protection to foodstuffs or ingredients from dust, germs, insects or rodents. Hygienic and easily cleaned. Provided with corner angles which give secure interstacking as illustrated.

On the right are illustrated other trays and containers from the Phœnix range. These may be inspected, or details obtained, at the address below. Please write to Dept. F.M.

**HESTON EQUIPMENT CO. LTD.**

1 BUCKINGHAM PALACE MANSIONS · LONDON · S.W.1.

Tel.: SLOane 9934-5-6

*Member of the Heston Group of Companies*

# "SILVER FOX" . . . *the metal of the age*

*Registered Trade Marks*

## STAINLESS STEEL

In the galleys of modern ocean going vessels stainless steel equipment is an inevitable choice. Its smooth surfaces can easily be kept scrupulously clean merely with soap and water, and its hard wearing qualities offer hygiene in every form of catering. Stainless steel is thoroughly practical and will last a lifetime.

*Galley of the s.s. "Iberia" manufactured by Henry Wilson and Company of Liverpool, and photographed in natural colour by kind permission of the P. & O. Steamship Company Limited.*

*Write for this free booklet*
*"Stainless Steel Safeguards your Health".*

THE UNITED STEEL COMPANIES LTD

SAMUEL FOX & COMPANY LIMITED
*Associated with The United Steel Companies Limited*
STOCKSBRIDGE WORKS · Nr. SHEFFIELD · ENGLAND

F368

**MALT EXTRACT**

**DRIED MALT EXTRACT POWDER**

**MALT FLOUR**

***An ever-increasing application to food industries***

EDWARD FISON LIMITED

FACTORY CEDARS · STOWMARKET · SUFFOLK

*Maltsters for more than a Century*

# Stainless Steel Pipe Fittings

The A.P.V. Company being one of the leading manufacturers of plant and equipment for the potable industries have long been the largest manufacturers of Stainless Steel Pipe Fittings. APV Stainless Steel Pipe Fittings are made in two types for the two methods of cleaning pipe lines.

**The "S.P." type** provides a crevice free, smooth, continuous bore, the fittings being both strong and yet light. The round nut is gripped by a special wrench and so cannot be loosened by unauthorised persons.

**The "R.J.T." type** is quickly and easily broken down for cleaning and is strong enough to withstand the rough handling inevitable with frequent dismantling.

**APV**

**THE A.P.V. COMPANY LIMITED, MANOR ROYAL, CRAWLEY, SUSSEX**
Telephone: Crawley 1360. Telegrams: Anaclastic, Crawley.

C·P FOR CONTINUOUS PROCESSING

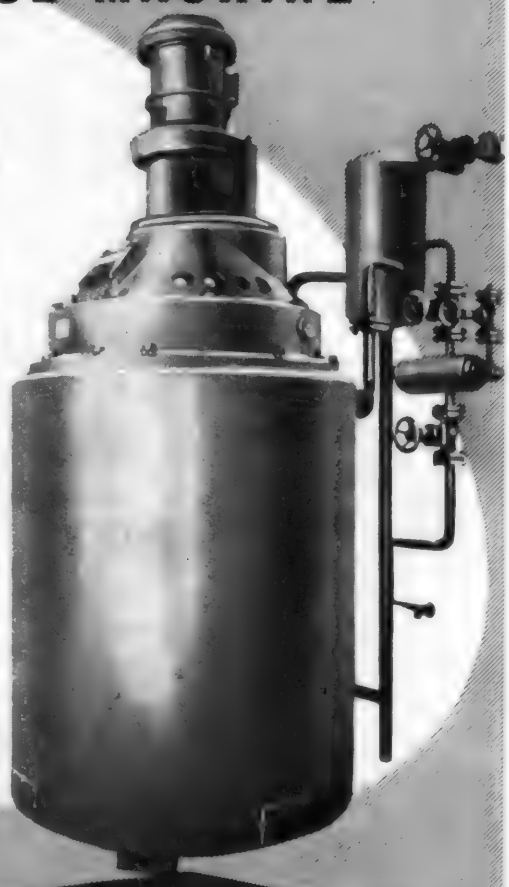
# VASTLY IMPROVED METHODS OF WATER CHILLING AND ICE PRODUCTION

*with the*

## Sabroe SOFT ICE MACHINE

Introduced in this country in recent years, the Sabroe Soft Ice Machine has achieved outstanding success.

The Sabroe Soft Ice principle is a revolutionary type, producing chilled water for all kinds of plant requiring large quantities of coolant to operate with increased efficiency.



BECAUSE OF THESE FEATURES

- Manufactured in five sizes, producing up to 1,540 lb. per hour ice.
- Provides a continual supply of chilled water at 32°F. even at peak loads.
- Rigidly built freezing cylinder with non-corrosive coating.
- Capacity can be increased by simply running the machine for longer hours and thereby reducing refrigeration costs.

Ensures large savings in ope[illegible] essential in the Chemical [illegible] Pharmaceutical Plant, Breweries, Sausage [illegible] Biscuit Factories, etc.

C·P EQUIPMENT LTD.

Formerly The Creamery Package Mfg. Co. (G.B.) Ltd.

[illegible] LON ROAD · MITCHAM · SURREY

[illegible] Telegrams "Sabroe, Ly" Mitcham

Have you an operating or control problem? If so,

# see if RENOLD chain can do it!

## and cut out costly individual manufacture

The examples below are taken from our booklet, "Chain Mechanisms"

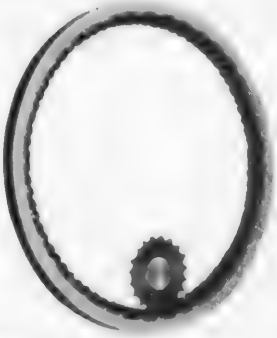
### SUPPORTING

A method of supporting, suitable for round or irregular sections.

### OSCILLATING-STRAIGHT-LINE MOTION

A mechanism with many applications, the example shown converting the oscillating movement of a beam into straight-line motion with a gravity return.

### GEARING-INTERNAL



A convenient method of imparting rotation inside circular sections.

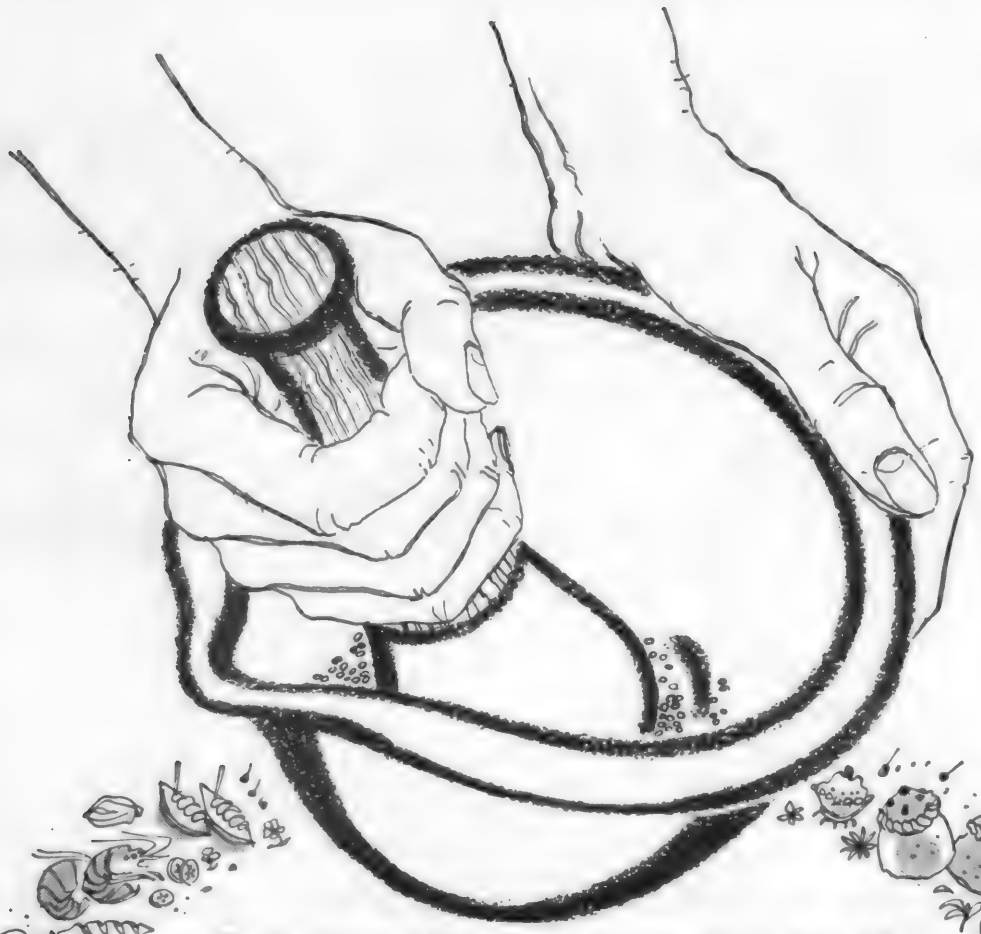
### PURCHASE BLOCK

Roller chain, used as a purchase, results in a compact light-weight assembly as a result of its high strength-weight ratio.

*Write for a copy of "Chain Mechanisms"—twenty basic ways of providing operating and control mechanisms in a cheap, efficient manner*

*Our engineers are always available for consultation*

RENOLD CHAINS LIMITED · MANCHESTER



*Stirring the imagination in the*

# BOEHM EXPERIMENTAL KITCHEN

In the Boehm Experimental Kitchen problems of food flavouring are tackled by experts. It is possible that they have tackled and mastered the kind of flavouring problem now causing *you* concern. So it might save you time and money to get in touch with Fredk. Boehm Ltd. immediately. Certain flavours in certain world-famous products owe their popularity to this organisation. The same skilled assistance is at your service, too, and it's free.

*Fredk. Boehm Ltd., continues to produce and distribute:*

**M S G** Mono-sodium glutamate 99% pure
**YEATEX** Autolysed yeast extract
**PROTEX** Hydrolised protein

Fredk. Boehm Ltd., 19 Bentinck St., London, W.1. Telephone: Wel 7933

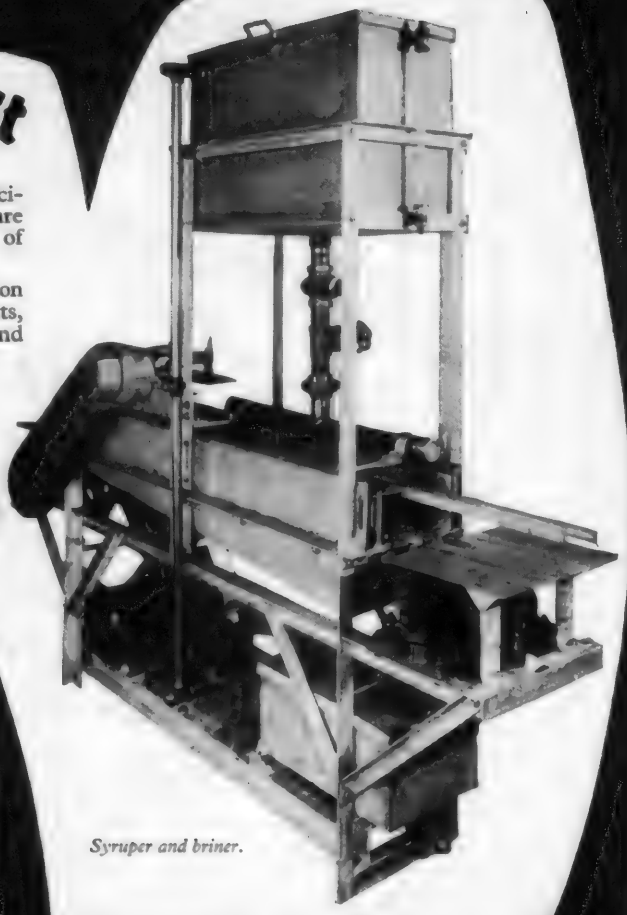
SPECIALITY
BISCUIT FLAVOURS
LINCOLN CREAM • COCONUT CREAM • TEA
MARIE • PETIT BEURRE • CUSTARD CREAM
CROMWELL • VANILLA • MADEIRA • CHOCOLATE
etc. etc.
We offer a complete range of speciality biscuit flavours which have been devised, as a result of our own research, to stand high temperature work. We shall be pleased to send on request whatever samples you may require for a test batch.
StaffordAllenS
STAFFORD ALLEN & SONS LTD.
WHARF ROAD · LONDON · N.1
Telephone CLErkenwell 1000 (7 lines)

# Let G.C. handle it

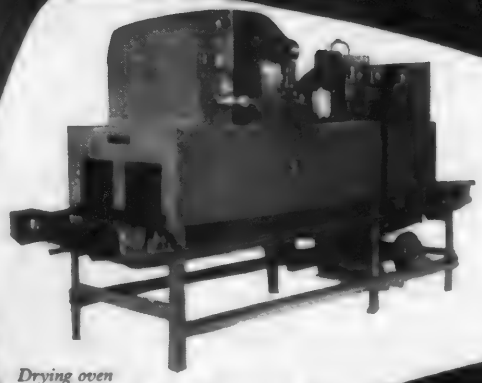
Increased production is dependent upon the efficiency of your mechanical handling equipment. We are specialists in the design and manufacture of plant of all kinds for the Food Industry.

Our products include can-handling plant, friction and bar elevators, cable conveyors, ovens, retorts, coolers, washers, blanchers, exhausters, graders and gooseneck elevators.

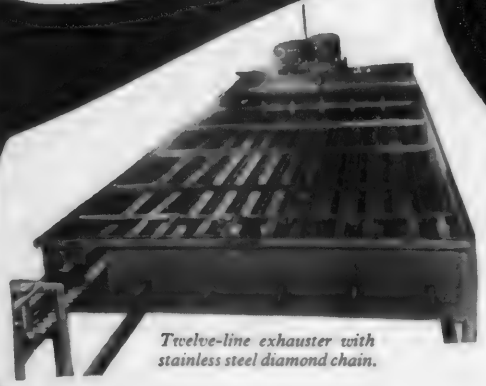
Consult us on your particular requirements.



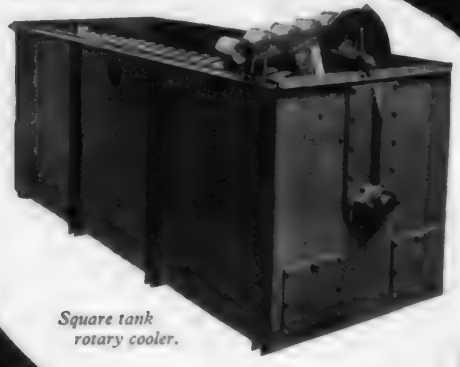
*Syruper and briner.*



*Drying oven as supplied to Dewey & Almy Ltd.*



*Twelve-line exhauster with stainless steel diamond chain.*



*Square tank rotary cooler.*

SOME OF THE WIDE RANGE OF

BRABY

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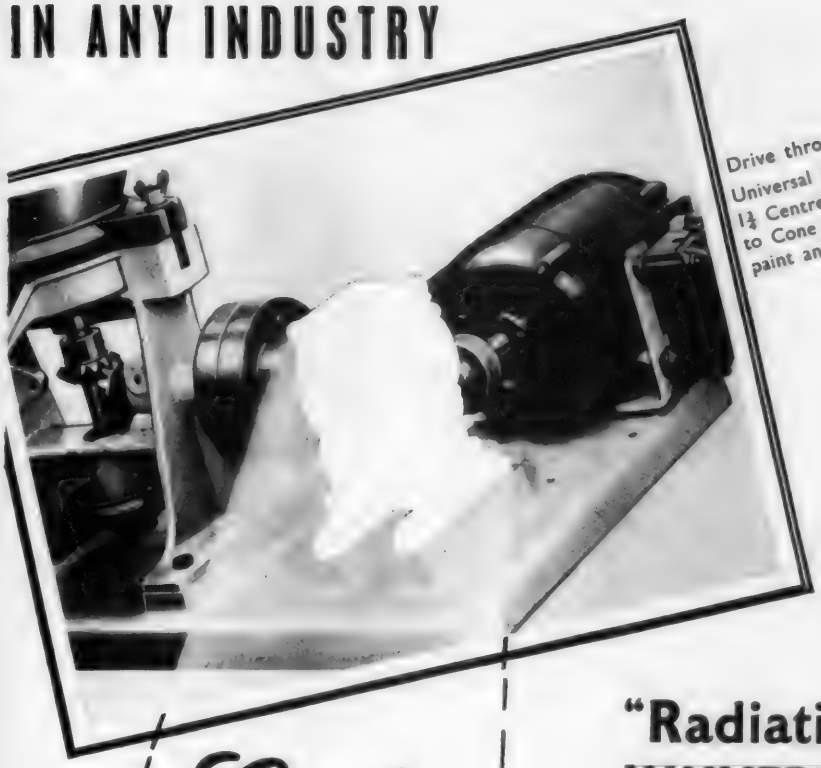

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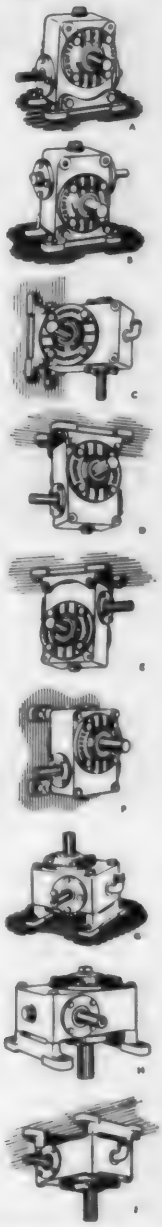

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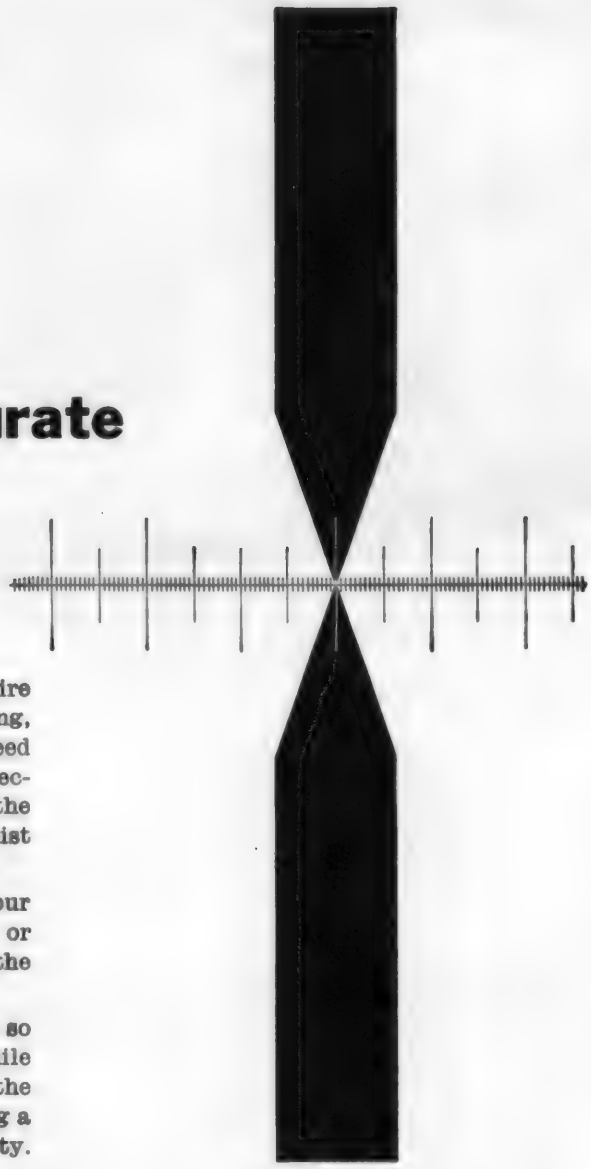

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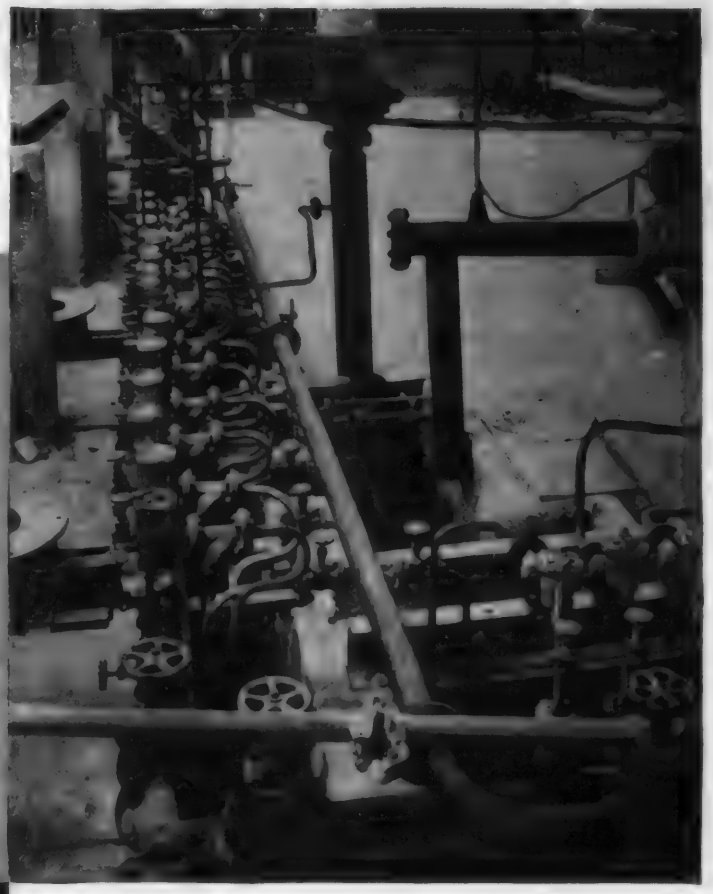

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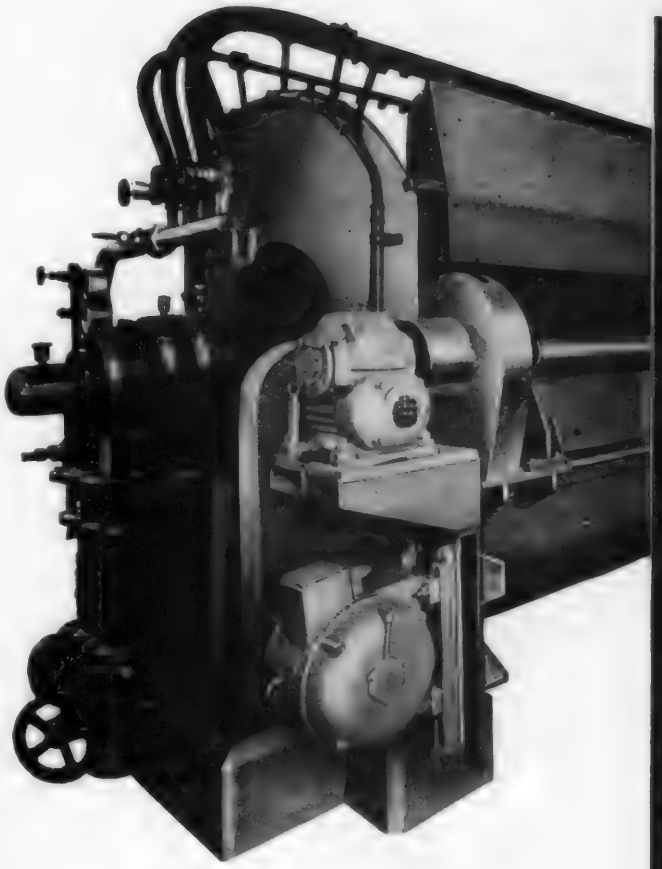

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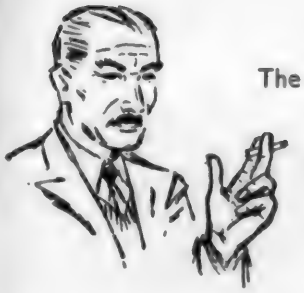

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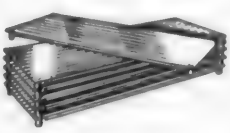

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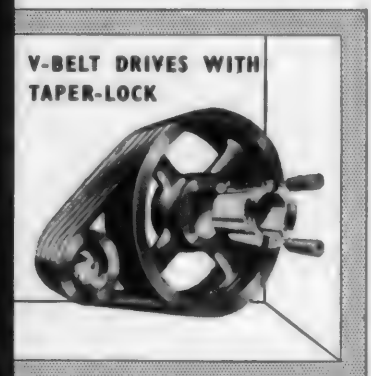

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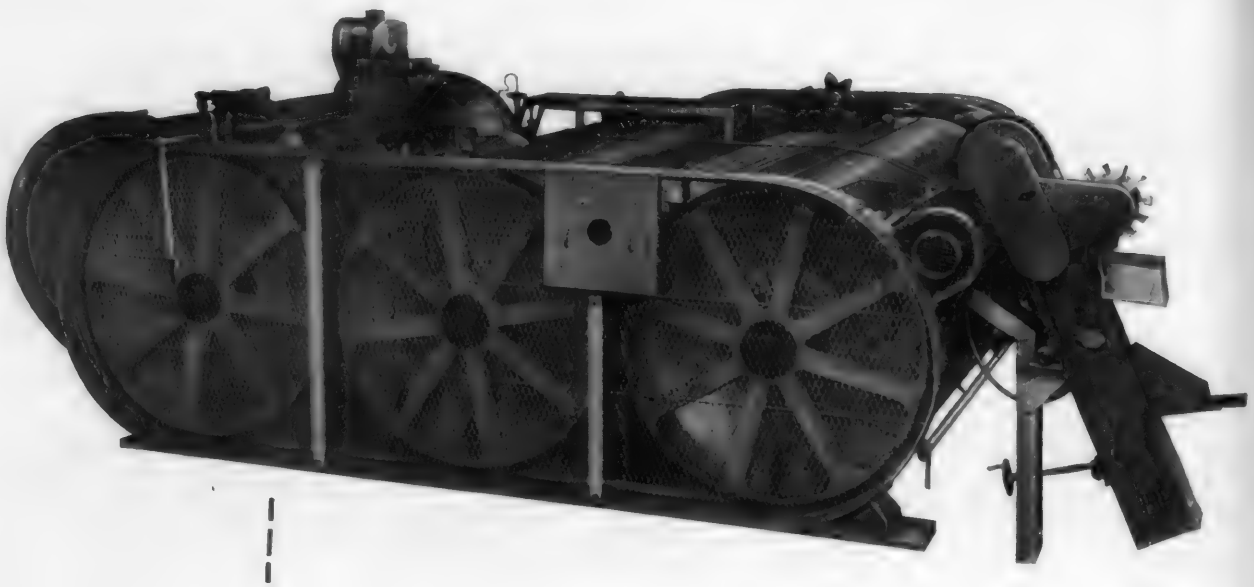

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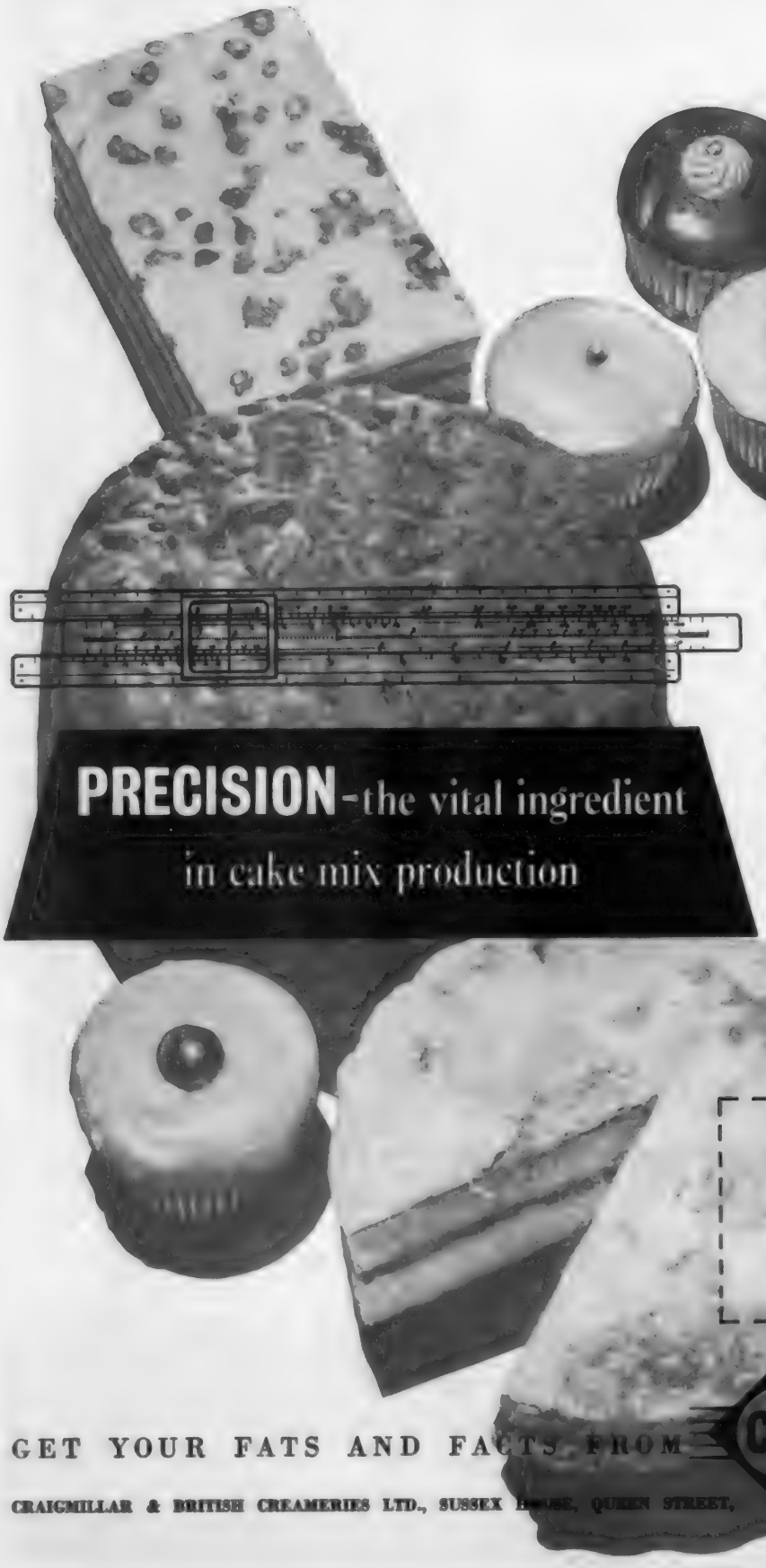

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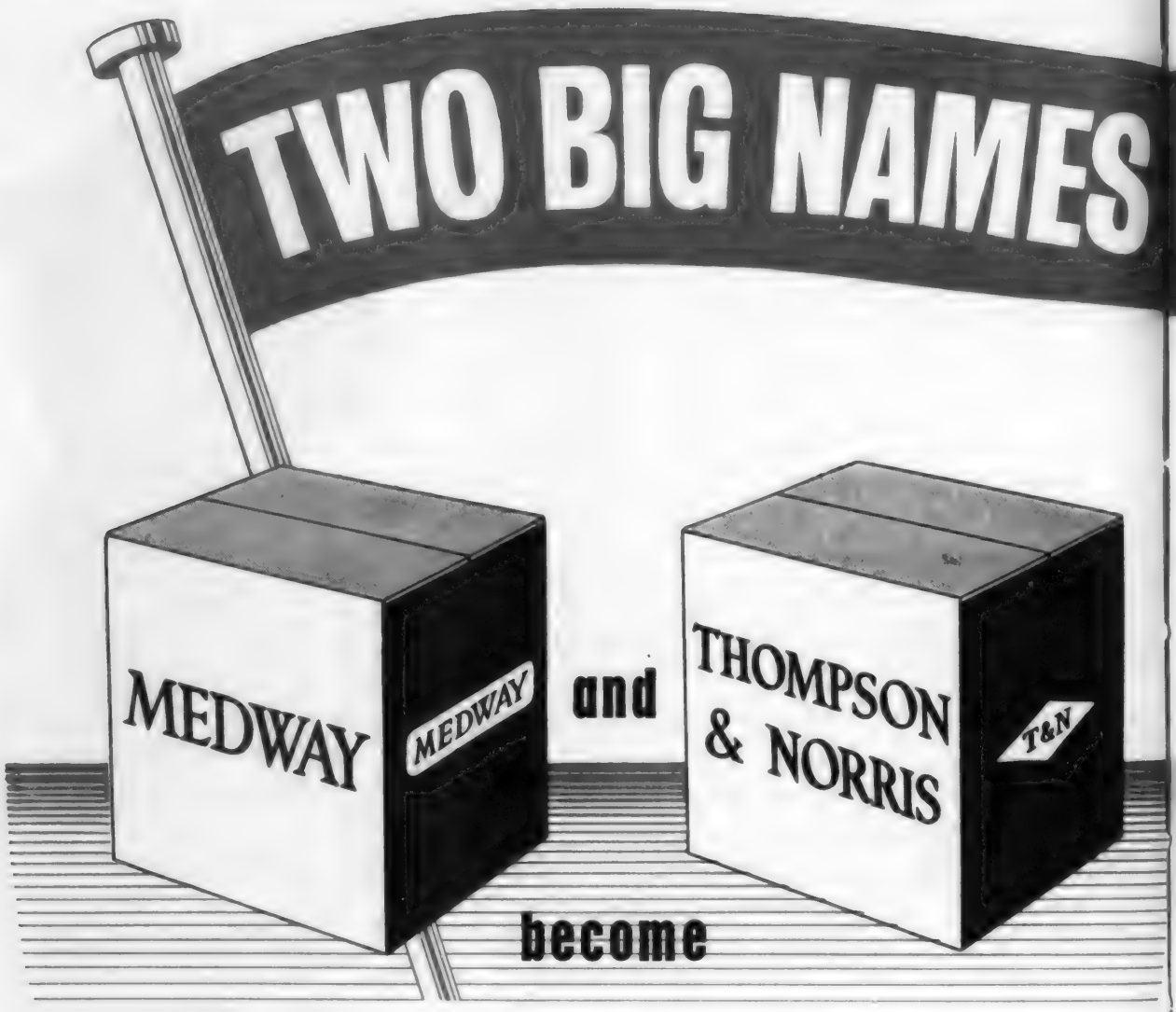


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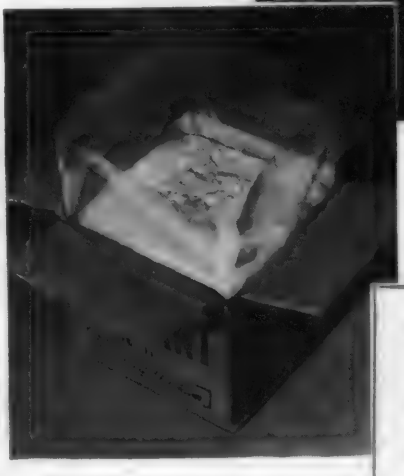
### THEY CUT PACKAGING COSTS

Because 'Visqueen' is incredibly strong, outers can be made of lighter materials, and they can be used again and again. Lighter weight cuts transport costs too!

'Visqueen' liners save waste because the whole of their contents can be recovered.



'Visqueen' Converters are leaders in the design and production of flexible packages. They can provide you with the exact package for YOUR requirements. The coupon will bring their names and addresses.

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ADDRESS .....

PRODUCT .....

Post to the address below.

BV.360

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British Visqueen Limited,
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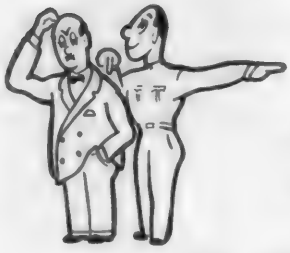
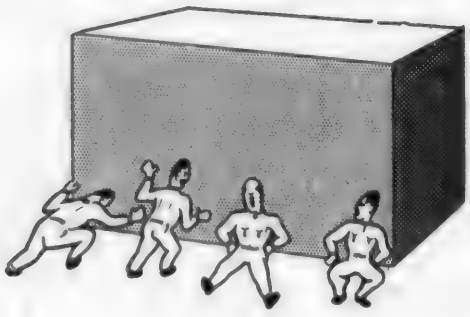
*A subsidiary company of Imperial Chemical Industries Limited*

**Solve your handling problems**





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*Something to save time, cost and effort in every industry from mining to milling.*

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53.A

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+ Can replace more expensive juices in all fruit products.

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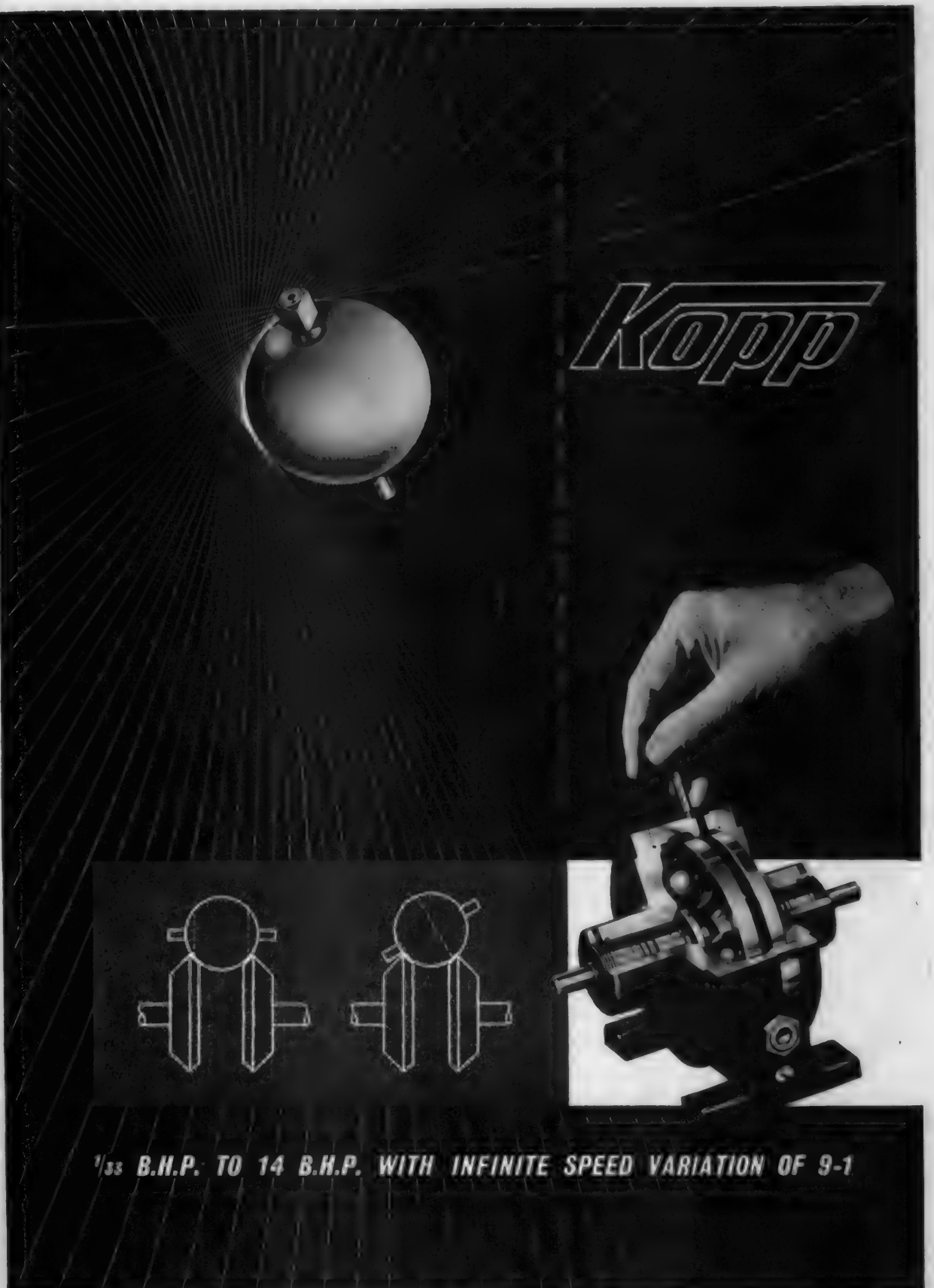


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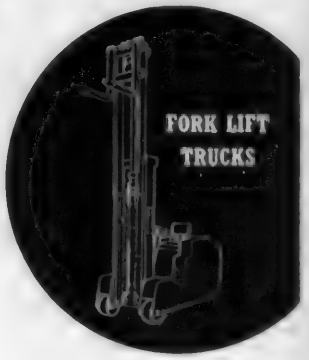


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*Some jugglers use plates and some use hoops... Matling* ***conjure*** *with space. Try the* ***magic*** *of Matling in your factory—our trucks will LOAD, UNLOAD, STACK, STORE, LIFT and TRANSPORT. Up high or on the ground Matling trucks appear to STRETCH SPACE—and you find it is* ***no illusion.***

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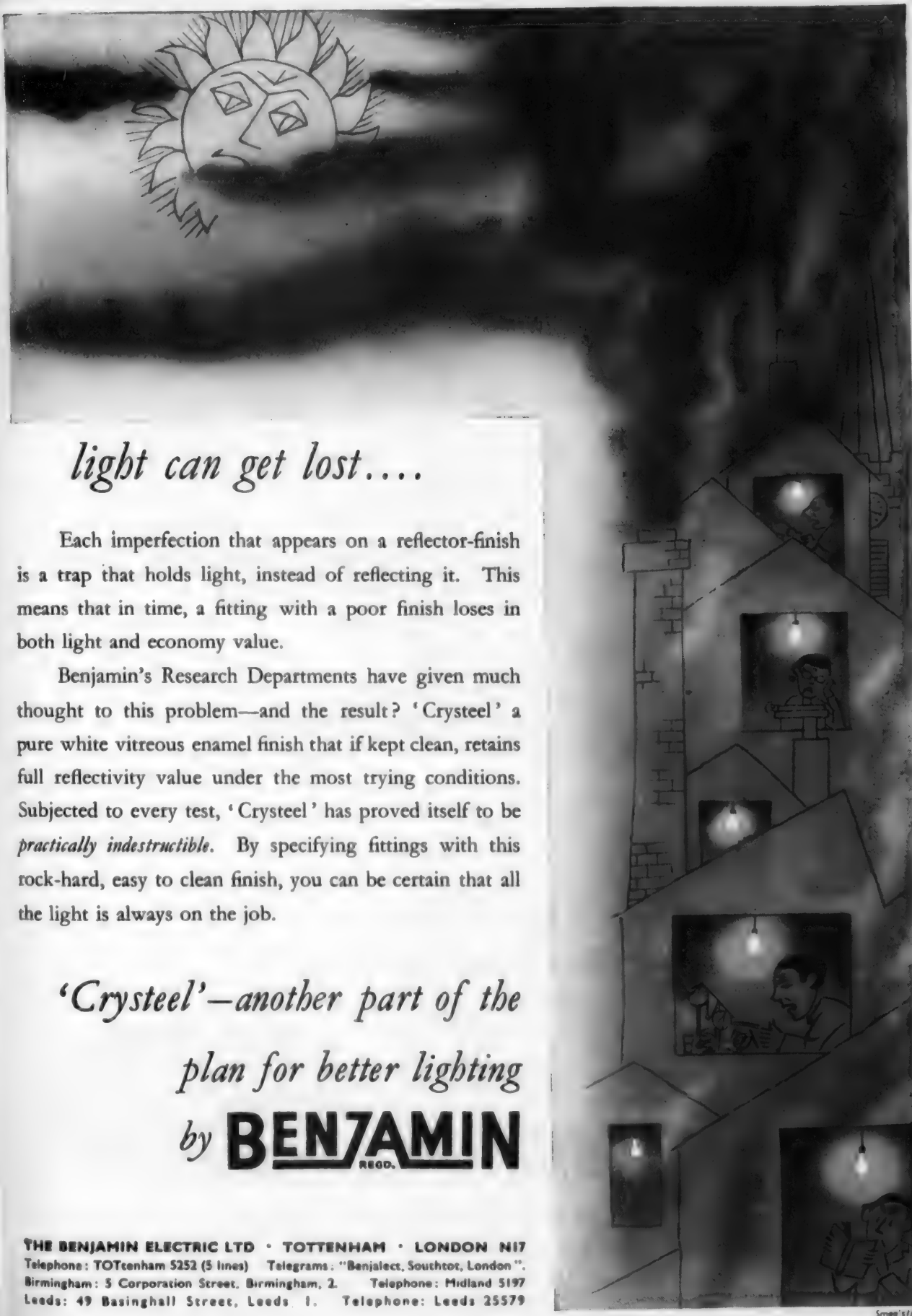

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Each imperfection that appears on a reflector-finish is a trap that holds light, instead of reflecting it. This means that in time, a fitting with a poor finish loses in both light and economy value.

Benjamin's Research Departments have given much thought to this problem—and the result? 'Crysteel' a pure white vitreous enamel finish that if kept clean, retains full reflectivity value under the most trying conditions. Subjected to every test, 'Crysteel' has proved itself to be *practically indestructible.* By specifying fittings with this rock-hard, easy to clean finish, you can be certain that all the light is always on the job.

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*have buttoned up*

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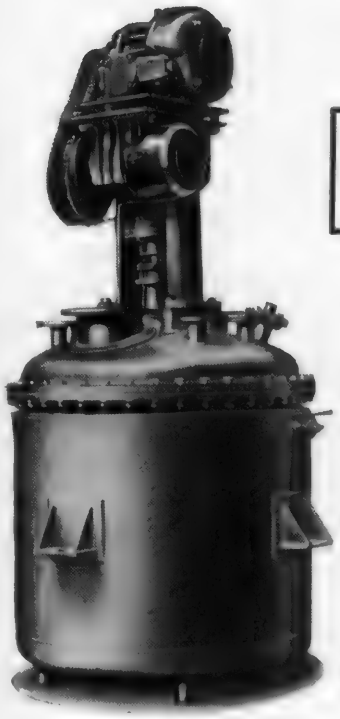

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STAINLESS STEEL
takes this paradox
in its stride:
it complies with the need
for sterility and hygiene
in storage and processing
equipment because
it resists any action from
contents, neither can
it act upon them.

## for storage processing and refining

Butterfields work to specification in producing a very wide range of Stainless Steel Equipment, for the Food Industry in which processing of liquids or powders is the daily round.

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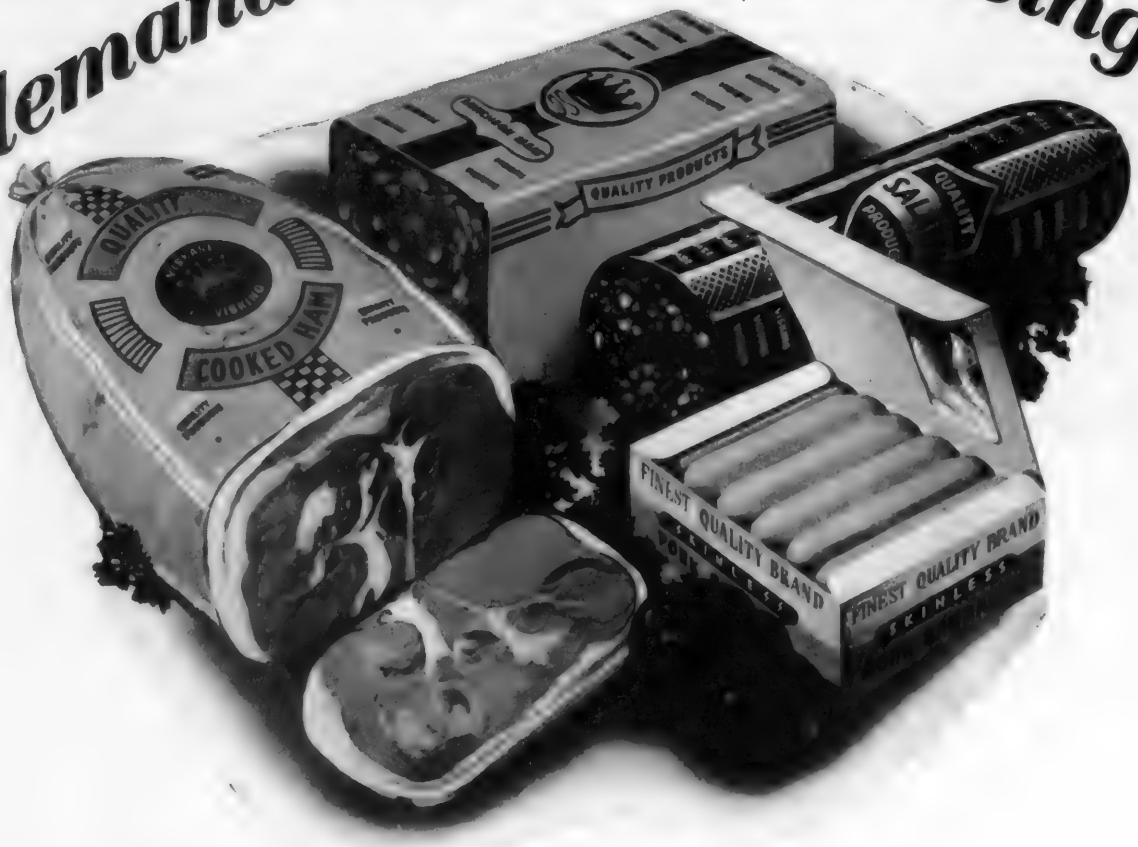


## at all times—specify

**Prepared meats, hams, sausages, look better, sell better and are hygienically protected when displayed in Visking casings. Crystal-clear, colourfully transparent, or opaque, Visking casings are printed in colour for improved display appeal. See for yourself how much better your own products look when 'Visking' packed. Our Representative will call to give you a demonstration.**

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VISKING

# CASINGS

"VISKING" IS THE REGISTERED TRADE MARK OF THE VISKING CORPORATION

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- ★ Time saving sliding doors, flush fitting.
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# MONOSODIUM GLUTAMATE

**99%**

*Manufactured by* DR. H. WUTHIER, A.G. *of Switzerland*

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All the day-to-day cleaning problems of equipment and premises concerned with the preparation, processing, packing and selling of food stuffs can be dealt with effectively by Teepol, Shell's master detergent.

Teepol is versatile, safe and easy to use. It rapidly wets and softens food and fatty residues. Is equally efficient in acid conditions. Rinses quickly and does not taint. As it is neither acid nor alkaline, it is safe for cleaning tinned and aluminium equipment.

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T.C.3

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**6, 8, 10/12 to the lb.**

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6 sausages to the pound..... quantity

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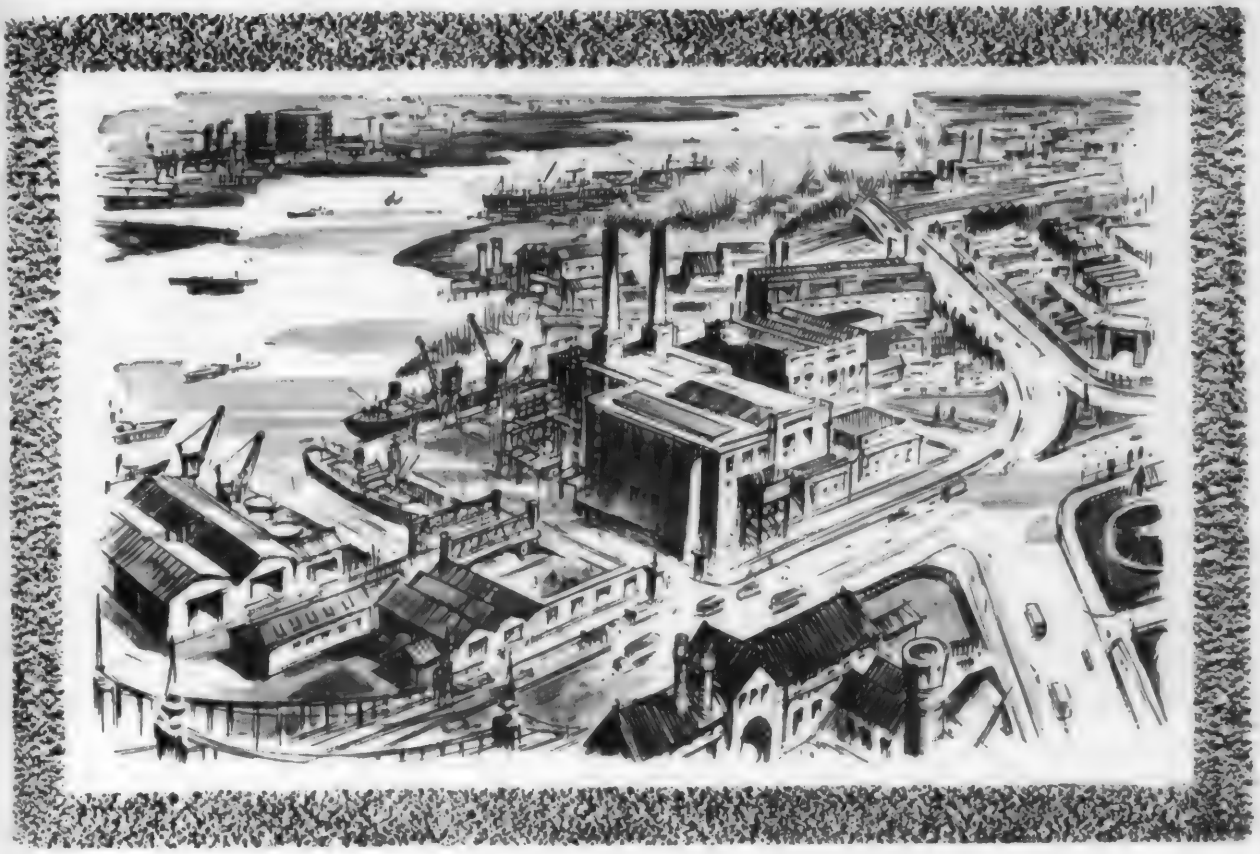

At a glance, nothing. But who would judge industrial efficiency at a glance? *You* wouldn't; you'd want to take a good look inside—at the control methods among other things. You'd want to know whether they were fully automatic at every suitable point. And you'd be right; for nowadays the really efficient plant uses automatic controls to save manpower and increase efficiency. And that means Sunvic. Sunvic make control and measurement equipment for almost every purpose in many major branches of industry. Sunvic controllers, relays, transmitters and thermometers are labour-saving, efficient and completely dependable. We shall be glad to offer expert advice on your control and measurement problems.

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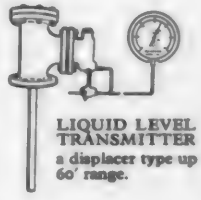

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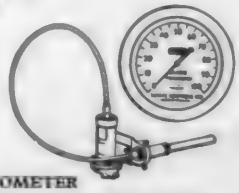
for measuring a wide range of process pressures up to 10,000 p.s.i.



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This colour is guaranteed to be entirely natural and free from any artificial or aniline dye. This is the strongest, richest and most economical preparation of its kind, and is very stable under high temperature.

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A Natural Product in a form which can be easily and conveniently and economically used by our customers.

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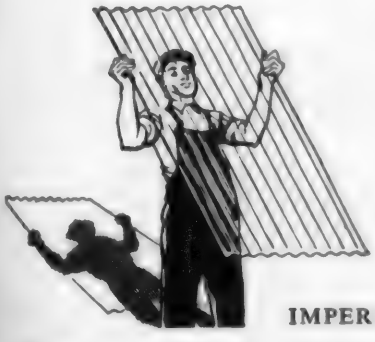

***It's as clear as daylight—***

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Write for details.

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EARLS COURT

**High Lift Fork Trucks**
For full utilisation of storage space.

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To carry stillages of processed parts between departments, often in and out of impossible places.

**Fixed Platform Trucks**
For heavy duty and dock service. Many hundreds are handling cargo in Liverpool and in all principal ports.

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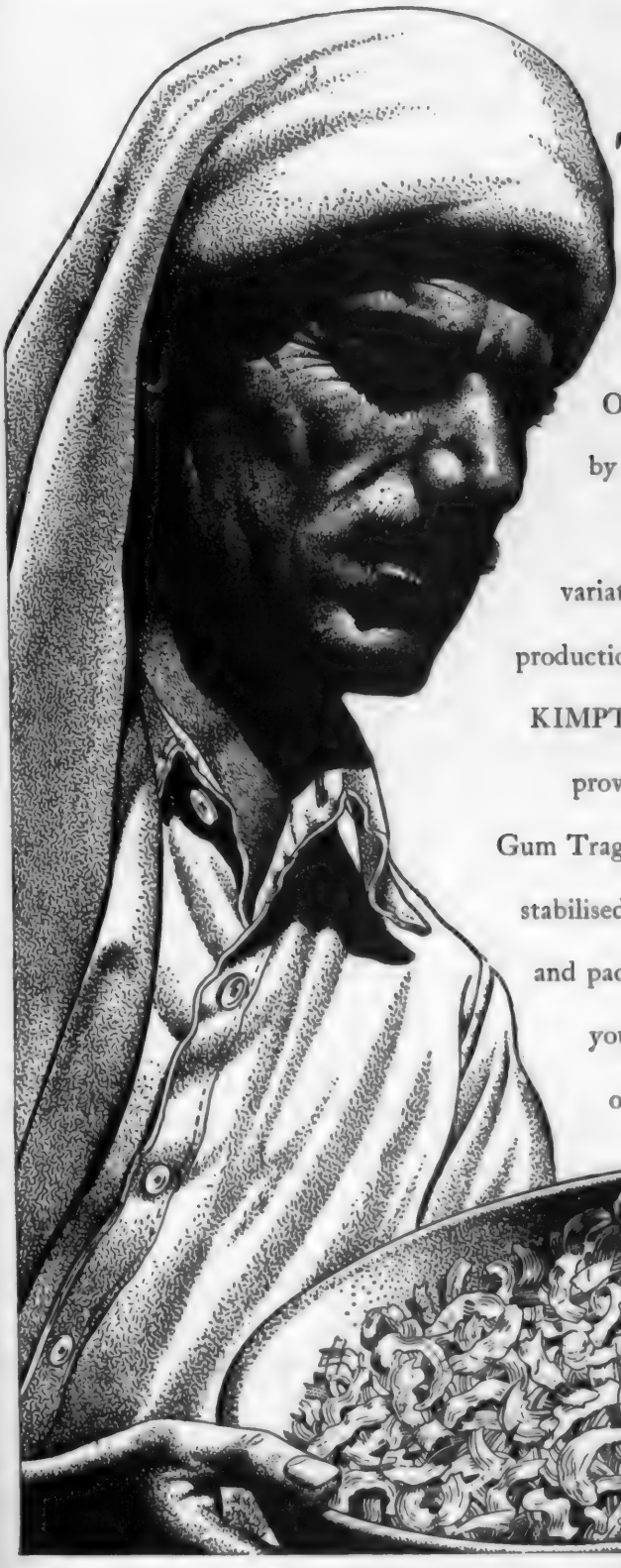

# THE BEST-*yet it isn't good enough*

Only the finest Gum Tragacanth flakes are bought by KIMPTON BROS. LTD. Gum Tragacanth in its natural state, however, has imperfections and variations which can create problems in a manufacturer's production. By processing it into "Red Carnation" Brand, KIMPTON BROS. LTD. have eliminated those problems, providing manufacturers with a choice of four grades of Gum Tragacanth, each of certified quality and characteristics, stabilised as regards viscosity, colour and fineness of powder, and packed in airtight tins. *Whatever* you order, *whenever* you order, you can be sure that every batch you get is of the same quality, and has the same characteristics

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*Established in* 1882

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**MATERIALS HANDLING DIVISION**

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Electronic Control Panel behind Brewery Fermenting Vat at Ely Brewery, Cardiff.

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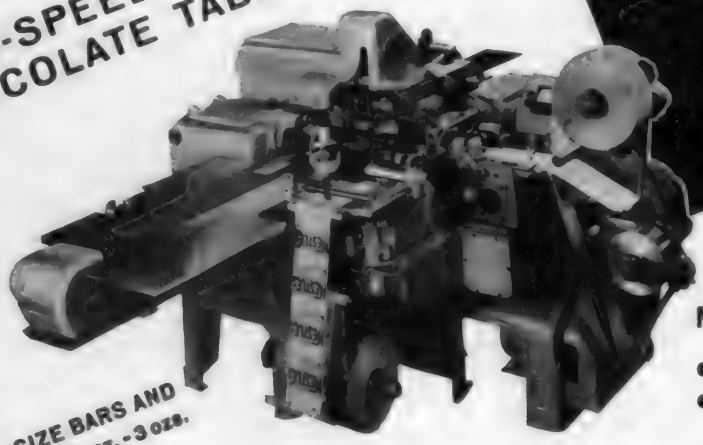

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# MODERN COFFEE PRODUCTION

*A. E. Haarer, F.L.S., Dip. Hort., R.H.S.*

The aim of this book is to supply the planter, the student and the field extension officer with an informative and interesting treatise in simple language. The author has endeavoured to say nothing that has not proved sound in practice or been based on the results of reliable research.

If the book has a strong East African flavour, it is not alone because the author has had his practical experience there, but because methods of cultivating coffee in East Africa are now of the highest order and are seldom equalled elsewhere. There are numerous line drawings and over a hundred photographs, some of which were taken by the author himself.

Starting with the early history of coffee, Mr. Haarer discusses at length all aspects of coffee production. There is detailed information on cytology, genetics, environment, shade, lining and holing, pruning, care and maintenance, harvesting, diseases, pests, etc., and a chapter devoted to the economic aspects. In addition, production in Africa, Asia and the Antipodes, and the Western Hemisphere is dealt with in greater detail in separate chapters.

The author's experience began at the age of twenty when he was appointed manager of coffee estates in Uganda. He was directly connected with the formation of the Kilimanjaro Native Planters' Association, now the K.N.C.U. In connection with his botanical collecting work for Kew and the British Museum he was elected a Fellow of the Linnean Society in 1928, and later, in 1930, he took charge of an Agricultural Training School. He now contributes to many journals at home and overseas, and has written several books on fibres.

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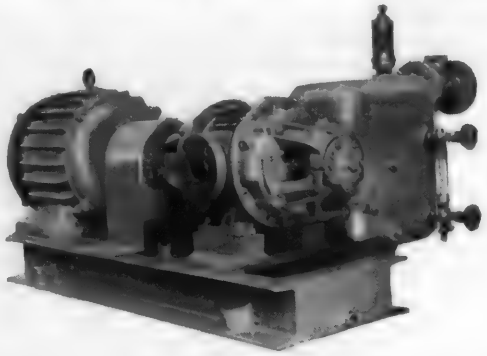

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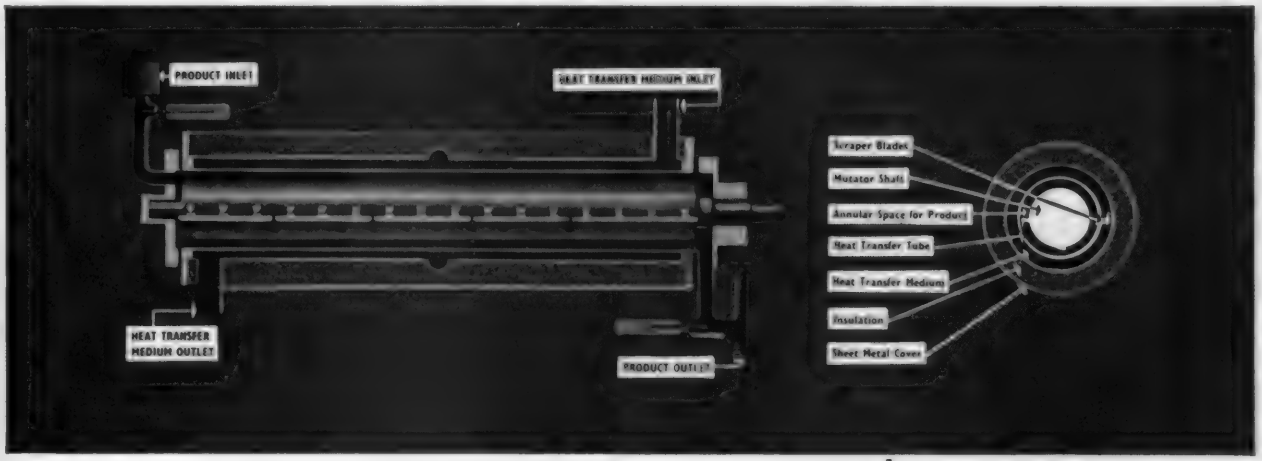


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# FOOD MANUFACTURE

Vol. XXXI. No. 4 · Published Monthly · April 1, 1956

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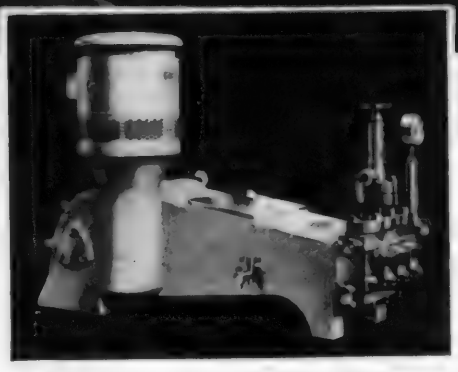

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FOOD MANUFACTURE

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## *Quick-cooking dehydrated vegetables*

MOST dehydrated root vegetables have the undesirable feature of requiring a period of soaking, usually from 1 to 2 hr., followed by cooking for 10 to 30 min. before they are ready for use. Leafy vegetables can be cooked without previous soaking, and usually require 10 to 20 min. boiling.

Reduction in the size of piece of the vegetable reduces or eliminates the period of soaking necessary but, except in the case of powdered forms, it has not hitherto been possible to reduce the cooking time to any great extent. For a number of reasons precooking the whole vegetable has proved unsatisfactory, and extending the water scald normally given to the diced vegetable before dehydration has led to flavourless products.

In recent work on the problem at the Experimental Factory of the Ministry of Agriculture, Fisheries and Food at Aberdeen, steam scalding has been employed instead of water scalding. Root vegetables in dice form, 1/16 × 5/16 × 3/8 in. or 1/8 × 5/16 × 3/8 in., scalded for periods varying from 3 to 10 min. for different vegetables, and then dehydrated in the normal manner, have given products which can be cooked without previous soaking in 4 to 5 min. for the thinner dice, and in 10 min. for the thicker dice. Appearance and flavour are, on the whole, well retained. These vegetables seem to be particularly suitable for inclusion in soup mixes.

## *7,000 bottles a minute*

THE FOOD and drink industries were largely responsible for the greater demand for glass bottles and jars last year which brought the total production figures in Britain up to 27,132,600 gross—a new record output. Announcing these figures the Glass Manufacturers' Federation said that the exact number of bottles and jars manufactured during 1955 by its members was 3,907,094,400. Since bottle making is a continuous day and night operation, this means that 7,434 bottles and jars were produced for each minute of the year.

Of the total production of 27·1 million gross bottles and jars the food industry took 17·4 million gross. The opening of more self-service shops—calling for a further growth in packaging—and the growing popularity of bottled over draught beers were two of the factors responsible for the production of nearly two million gross bottles more for the food industry than in the preceding year. Once again the phenomenal summer of 1955 played its part in increasing production and supplies—the soft drinks industry flourished and their fast selling products needed bottles.

Although output is now more than double the prewar figures, this has been achieved with a smaller proportional increase in the number of workers. The glass container industry has concentrated on increasing its mechanisation since the early 1920s. "Automation," says the Federation, "has long been an accepted fact." Production has noticeably risen since 1945 when much plant and machinery was installed. In that year the output of glass containers was 15 million gross compared with 12 million gross before the war. By 1950 it had risen to 21·7 million gross.

## *"Unsound" food*

TWO recent judgments in the Divisional Court of the Queen's Bench Division should cause would-be litigants to hesitate before bringing cases under section 9 of the Foods and Drugs Act, that section which deals with "unsound" food. In both cases the food concerned contained foreign bodies. In one an irate mother went to court when her son bit on a piece of metal in a chocolate cream bun bought in a Battersea shop. The magistrate thought that the piece of metal rendered the bun as a whole unfit for human consumption and fined the bakers £10 with three guineas costs. The bakers appealed to the Divisional Court where the Lord Chief Justice, whose comments on sausages we mentioned last month, delivered himself of the opinion that the conviction was wrong. Section 9 was concerned with unsound food and how could it be said that food became unsound—that is, putrid or dangerous to health—merely because there was a piece of extraneous matter in it which had no effect on the general composition of the food? It was like buying game and finding shot in it, or threepenny pieces in the Christmas pudding. The L.C.J. could not understand how the magistrate thought that a bun with a piece of metal in it could fairly be de-

scribed as unfit for human consumption and he allowed the appeal.

The second case concerned string in a loaf. Again the sellers were convicted and again their appeal was allowed on the same arguments quoted above.

It would appear that these sentences were quashed because the cases were brought under the wrong section of the Act. Sections 3 and 4 deal with extraneous matter in food to the prejudice of the purchaser.

A third appeal in the Divisional Court from a conviction under section 9 was not allowed, however. A firm of bakers sold a loaf which contained part of a used and dirty bandage adhering to the bottom crust. The Judges were indignant that the bakers had made an appeal, pointing out that the bandage might have been extremely toxic. It was clearly actionable under section 9 and the L.C.J. expressed surprise that the firm had thought fit to appeal and thus advertise their lapse.

## *Fish flour*

FLOUR produced from fish is attracting the attention of Canadian and South African food technologists. In Canada small amounts of fish protein have been mixed with flour in laboratory tests to obtain loaves of good appearance, according to Dr. H. Fougere of Halifax when he addressed the annual meeting of the Fisheries Research Board of Canada recently.

Dr. Fougere told the board that the Atlantic Fisheries Experimental Station, of which he is acting director, had manufactured from fish flesh a protein which was white, odourless and tasteless. A sample was kept exposed to light and air for six weeks without any change in taste or colour.

Bread baked with flour containing from 10 to 20% of its weight of the fish protein had an agreeable odour, according to Dr. Fougere. The assessment of the economics involved in the production of edible proteins, however, awaits reports and the results of pilot plant efforts.

The South African Fishing Industry Research Institute has also developed a fish flour which is said to be quite palatable if introduced in quantities of up to 8% of the finished product in bread. In fact, according to Dr. G. M. Dreosti, the director of the Institute, this fish flour improves the bread and gives it a better colour.. The development of the flour is part of a research project aimed at making fish readily available to the under-privileged populations of South Africa.

It is, of course, too early to try and forecast the effect of these developments on the food industry, but they should certainly be borne in mind when considering the future of the wheat-using industries and the fish industry.

## *Red light on vitamins*

VITAMINS were first discovered by a Russian scientist, according to the Soviet nutritional journal *Voprosy Pitaniya*. The experimental work of N. I. Lunin (1853-1937) is described.

Lunin, who was studying the rôle of alkali salts in the neutralisation of sulphuric acid—at one time thought to be a product of protein metabolism in the animal organism—found that white rats lived from 11 to 21 days on a synthetic diet of thoroughly washed casein, milk fat and sucrose. Their lives were prolonged to 26 days by the addition of sodium carbonate in the amount necessary to neutralise all sulphuric acid if formed from dietary sulphur. While the substitution of sodium chloride for sodium carbonate and the addition of mineral supplements could not save the rats' lives, those fed on fresh milk grew and developed normally. Lunin concluded that milk contains, besides proteins, fat, sugar, salts and water, other substances essential for animal nutrition.

The same article laments the lack of recognition given to those Russians who first invented the watch spring, the steam engine, the electric arc, the incandescent lamp, the radio and the first aeroplane!

## *Snap frozen beef*

A REVOLUTIONARY development in the preparation of Australian beef for the United Kingdom market was announced in Perth recently by Mr. Gordon Blythe, managing director of Air Beef Pty., Ltd. Equipment for snap freezing specially prepared cuts of meat is now being installed at the Glenroy abattoirs in the heart of the Kimberleys. This means that beef on the hoof will go in one end of the works and come out the other end in attractive snap frozen packages ready for the kitchen.

Mr. Blythe explained that the snap freezing principle will be tried on an experimental basis this season. Seven beasts out of each day's kill of 60 will be boned out and prepared into retail cuts. Including the offal, this will total about 4,000 lb. a day.

All types of steaks, including rump, T-bone and topside, will be packed in 2 lb. *Cellophane* packs; 4 lb. sirloin roasts in *Cellophane* packs; and larger cuts in polythene bags. All offal—tongues, hearts, tails, etc.—produced at Glenroy will also be packed into polythene bags.

The packed meat is snap frozen, packed into cartons and stored in the Glenroy cool chambers until it is flown to Wyndham, 187 miles away, by MacRobertson Miller Airlines, one of the co-founders of Air Beef, for distribution to local, United Kingdom and other markets.

The weight of a carton will vary from 40 lb. to

70 lb., depending on the cut of meat. Each package will be labelled with its variety and weight, and each carton will carry a description of contents. The snap freezing plant will be ready for operation about the middle of May, about a fortnight after the start of the season.

Mr. Blythe said the initial installation will be regarded as a pilot plant. If it proves to be as economical and profitable as anticipated, it is expected that the whole of the Glenroy kill will be specially packed and snap frozen.

This will be the first time that beef from Australia for the United Kingdom market has been processed in this manner.

## *Choosing essential oils*

SOME useful hints on buying essential oils are given by W. R. Littlejohn in a recent issue of the *Journal* of the Society of Cosmetic Chemists. Mr. Littlejohn emphasises that essential oils vary from season to season and from locality to locality in much the same way as wine. A chemical examination is necessary, but it should be regarded as a diagnosis rather than as a final verdict. After this examination and a comparison of the results with figures given in standard reference works like Guenther's "Essential Oils," the next and deciding stage of evaluation commences. This is the taste test. It cannot be overstressed that the value of an essential oil depends upon the odour and flavour it imparts to a finished product. With oil for use in the beverage industry, the sample should be made into a soluble essence by shaking 1 vol. with 4 vol. of 70% ethyl alcohol and using the resulting lower layer at the rate of 1 to 2 oz. to a gal. of mineral water syrup (6 lb. of sugar in 1 gal. of syrup acidified with 2 oz. of citric acid per gal.) and diluting the resulting syrup with water at the rate of 1½ oz. of syrup up to half-pint with plain or aerated water.

If the oil is intended for the confectionery industry it can be tested in fondant at a rate of 1 in 10,000, or if the oil is intended for high boilings a small batch of boiled sweets should be made in the laboratory to see if the oil reacts favourably to heat treatment. Similarly for flour confectionery a small cake or some biscuits should be made.

Having narrowed the choice of samples by these methods, the deciding factor will now rest on the price of the oil and its behaviour in the finished product. A small batch of the final product in which it is intended to incorporate the essential oil is made under the same conditions and using the same constituents as standard works batches, and compared with the standard product for flavour. Having carried out all these tests, it is then that price has to be taken into account.

## *Produce prepackaging*

"A DRAMATIC increase" in the prepackaging of fruits and vegetables in Britain during the next 12 months was forecast by a member of the team which recently studied produce prepackaging in the U.S.A.

Comprising growers, retailers and members of the packaging industry, the team spent an intensive three weeks touring America from New York to California. The visit was organised by the Metal Box Co., Ltd., in co-operation with the Continental Can Co., Inc., with whom Metal Box have close ties. Metal Box have a deep interest in the development of produce prepackaging since they manufacture *Diothene* film bags and other packaging for fruit and vegetables. The three representatives of the packaging industry on the team were all members of Metal Box.

Besides studying the latest materials, machinery and methods, the team tried to assess to what extent American practice could be adopted in this country. They saw prepackaging operations at the grower-shipper level (corresponding to our grower-co-operative), at terminal packing stations, in the chain store warehouses and at store packing houses. They found that success depends on large-scale factory operations—produce prepackaging on a small scale brings little profit. About 20% of all produce is now sold ready packaged in the U.S., but some lines are nearly all prepackaged.

Prepackaging in Britain is on a limited scale but has shown a remarkable growth over the past two years. One member of the team stated that he started with 2,000 packets per week and now sells from 7,000 to 8,000 packets a day. He expects to make a sale of 15,000 packets a day when his plant is installed. There are now more than 1,000 retail outlets for prepackaged produce. Without being over-optimistic the team thought that, with proper large-scale organisation, prepackaged produce could be sold in Britain at little or no greater cost than the present price of fruit and vegetables.

Prepackaging can certainly bring a number of advantages to the consumer, grower, distributor and retailer. Waste would be at a minimum and for the first time it would be possible, by date-coding packages, to check the freshness of fruit and vegetables. However, it is not certain that British housewives would take to the innovation with the same rollicking enthusiasm of their American sisters. It may not be irrelevant to draw a parallel between prepackaged produce and wrapped bread. In this country 99% of wrapped bread is purchased because it is sliced. The British housewife is prepared to spend another penny a loaf for an extra convenience but not for more hygienic protection. Is there a lesson here for the proponents of prepackaging?

## *Roman canning congress*

CANNERS have the opportunity this year of combining business with pleasure by attending the 3rd International Congress on Canned Foods which will take place in Rome from September 24 to 28 inclusive. They will also be able, if they wish, to visit nearby Parma where concurrently the 11th Canned Food and Packing International Fair is being staged.

Speakers from eight countries will give papers and be available for subsequent discussions at the Congress. Six of them are British and include Dr. Denis Dickinson of the Fruit and Vegetable Canning and Quick Freezing Research Association and a contributor to FOOD MANUFACTURE, Dr. M. Ingram of the Low Temperature Research Station, Prof. J. Yudkin who is professor of nutrition at Queen Elizabeth College, W. R. Lewis, assistant director of the Tin Research Institute, and H. Liebmann and V. J. Dreschfeld, both of the Metal Box Co., Ltd.

The Congress will cover a very wide range of subjects, commencing with a survey of current problems in canning technology. Containers, machinery, organisation and marketing, sanitation, educational problems, nutrition, and bacteriological problems will also be discussed. Those who visit the Parma fair will also be able to attend a lecture on machinery and equipment for the canned food industry.

## *Preventing spoilage of sausages*

THE trend towards skinless, pre-packed sausages has brought with it problems of mould and slime formation which do not arise to the same degree with conventional sausages. In a study of the problem, the American Meat Institute Foundation found that a vast number of micro-organisms are involved; for instance, 353 different types of organisms were isolated from 36 packages of frankfurters which had been allowed to develop slime. Admittedly only one was poisonous, namely a *Staphylococcus*, but the fact remains that spoiled sausages do no good to the reputition of the manufacturer or retailer.

None of the responsible micro-organisms would be expected to survive the normal processing temperatures, so it is concluded that the products must have become contaminated after smoking and cooking. Furthermore, since the organisms cannot penetrate the casing or sealed package, the contamination must have occurred during the peeling, slicing and packaging operations. Thus it is clear that the most likely sources of contamination are the hands and clothing of operators and the surfaces of equipment. Airborne contamination can be discounted in most cases.

The most important single factor in delaying slime and mould development is adequate refrigeration of the products at all times after smoking and cooking. Many of the moulds and the sliming organisms are able to grow at temperatures as low as 32°F. Spoilage develops at least twice as fast at 40°F. as at 32°F. and at least four times as fast at 50°F. as at 32°F. Vacuum packaging will control mould problems but cannot be relied on to prevent slime. Most of the organisms responsible for sliming grow as well in the absence of air as in its presence.

Cleanliness on the part of the operatives and sanitary conditions in the plant itself are essential.

The foregoing are the most effective means of preventing spoilage of sausages but help may also be forthcoming from chemical preservatives. In the U.S. sorbic acid is being used with some success to prevent or retard mould growth on a variety of foods. It is described as a harmless fatty acid which can be metabolised as a food by humans. However, it is unlikely to be of much help in the slime problem.

Another group of chemicals—antibiotics—may prove to be excellent preventives of slime on sausages if and when their use in foods is approved. However, no chemical should ever be considered a substitute for good sanitation and handling procedures.

## *Pale stale ale*

NOVELTY is the spice of advertisement, so when a brewing company suddenly began to call one of its products "Olde Frothingslosh" and to describe it as a "pale stale ale," it is not surprising that its advertisements attracted attention.

The Pittsburgh Brewing Co. observed that a popular radio announcer spent most of his programme guying various imaginary products, including a mythical brew called "Olde Frothingslosh." Quick to see a chance for a new publicity gimmick, the Pittsburgh company themselves designed "Olde Frothingslosh" labels and cartons, and packed a special "holiday carton" of 24 bottles of their own beer under the name. Then they advertised it on their own radio and television programme.

"The foam is on the bottom" was one of the claims made for the pale stale ale and television was able, with an inverted camera image, to make the claim seem real. More camera tricks were played to emphasise Olde Frothingslosh's other unique properties, notably its lightness—the beer was seen to float up from a refrigerator shelf to bump against the shelf above and stay there.

The programmes were highly successful and so were the company's sales of Olde Frothingslosh. Needless to say the labels and cartons made it clear that "only the label's in fun, the beer is actually Tech Premium Pilsener" and contained a request to re-order under the correct name.

# PECTIN – Major By-product of the Apple

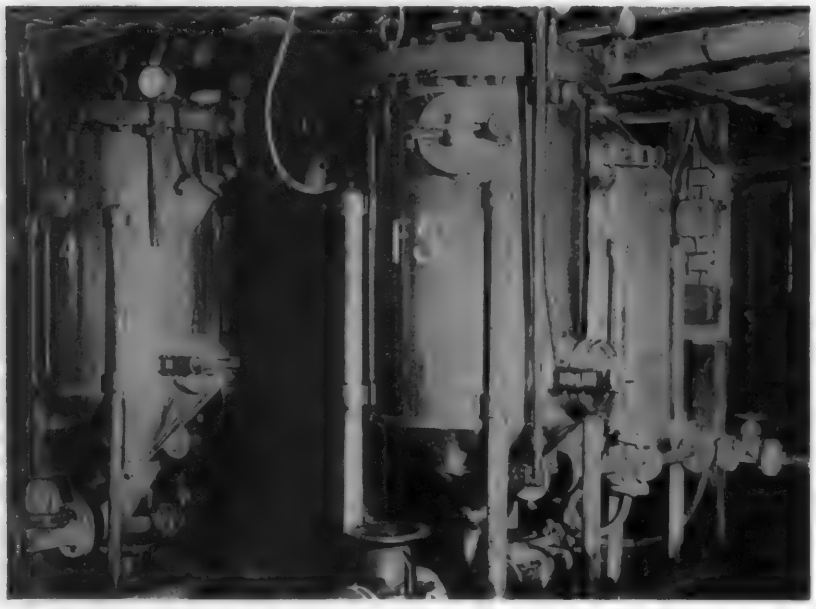
**For over a hundred years William Evans and Co. (Hereford and Devon), Ltd. have been known as cider makers. Food manufacturers, however, also know them as makers of other apple products, particularly pectin, which has become the chief interest of the company. While it is chiefly used for setting jams, pectin is also extensively used in the manufacture of chocolate fruit centres, confectionery, ice cream, soft and carbonated beverages and processed cheese. This article describes the chemistry, manufacture and uses of pectin with formulæ for its application in various branches of the food industry.**

CIDER making was a lucrative business in the 19th century and when, in 1850, William Evans set up his modest factory at the corner of Blueschool Street, Hereford, he enjoyed a comfortable prosperity. His successor William Chave, a pharmaceutical chemist, applied his knowledge of science to cider making and the business became a great deal more profitable, moving to larger premises at Widemarsh. But William Chave and his sons were not content to deal only in cider. Extensive research on other constituents of the apple went on and in 1917 the company—now William Evans and Co. (Hereford and Devon), Ltd.—started the first commercial production of pectin in this country. The large furnace which the company had built to dispose of the pressed apple tissue known as apple pomace was replaced by specially constructed drying plants and today the production of pectin has become the chief interest of the company. Practically all the pectin produced in Britain is made in Hereford.

**EXTRACTION.** (*Above*) **Pulp passes from staging tanks through these extraction presses. Specially adapted for pectin manufacture, they work on the rack and cloth principle, with plates of stainless steel gauze replacing the cloth in the frames.**

### Chemistry of pectin

Pectin, which occurs in nearly all fruits and particularly the apple, is one of the most interesting substances known to science and even today its exact constitutional formula is not agreed on. Although its first recorded discovery was in 1825, it was not until 1917, when Von Fellenberg showed that pectin could be saponified into sodium pectate and methyl alcohol, that any real progress was made in elucidating its constitution. About the same time, Erlich, working independently, found that on hydrolysis, not only were methoxy groups split off but also galactose residues in the form of galacturonic acid. He assumed that several such galacturonic groups were condensed together in the pectin molecule. Later work has provided evidence that the structure of the pectin molecule is built up from galacturonic acid residues



**FILTRATION. The pectin solution passes twice through these Metafilters: for rough filtration and—after de-starching and temperature adjustment—for bright filtration.**

linked through the 1-4 positions. These chains of variable length may also be combined further in some manner, such as through ester, lactone or anhydride linkages. Much more research needs to be done before any final conclusions are drawn regarding the structure of pectin.

**Production at Hereford**

Since they started pectin production 38 years ago, William Evans have expanded considerably and for the past few years the product has been extracted in a specially equipped multi-storey factory only a stone's throw from part of the original works erected by William Chave in 1880. Although they use pomace produced from their own cider factory, the quantity of pectin made by William Evans is such that they find it necessary to buy additional supplies from other cider manufacturers in this country and abroad. Pectin cannot be extracted in good yield from fresh pomace because of its slimy character and the pomace is dried before use. Samples of each load of pomace are analysed for pectin content and graded by the laboratory on their arrival at the factory and the grades stored separately. The quantity of pectin in pomace varies from year to year over different areas. These laboratory analyses form the basis of the blends and grades of pectin supplied by the company.

**Processing of pomace**

The stacks of raw pomace are broken down day by day according to formulæ supplied by the laboratory and are transferred to the top of the building. The different grades in their respective quantities are grouped round a series of hoppers and emptied into them as required. The charge flows down from the hoppers into large cooking tanks where it is boiled with acidulated water for a specified time varying with the grade of the raw material, since pectin manufacture is a controlled acid hydrolysis process. This extraction process is fundamentally a hydrolysis of the protopectin in the pomace into a soluble form. The hydrolysis is carefully regulated, time, temperature and *p*H being controlled to ensure that a maximum amount of protopectin is brought into solution. As the boil from each cooking tank is completed, the product is bulked into common staging (holding) tanks and neutraliser added.

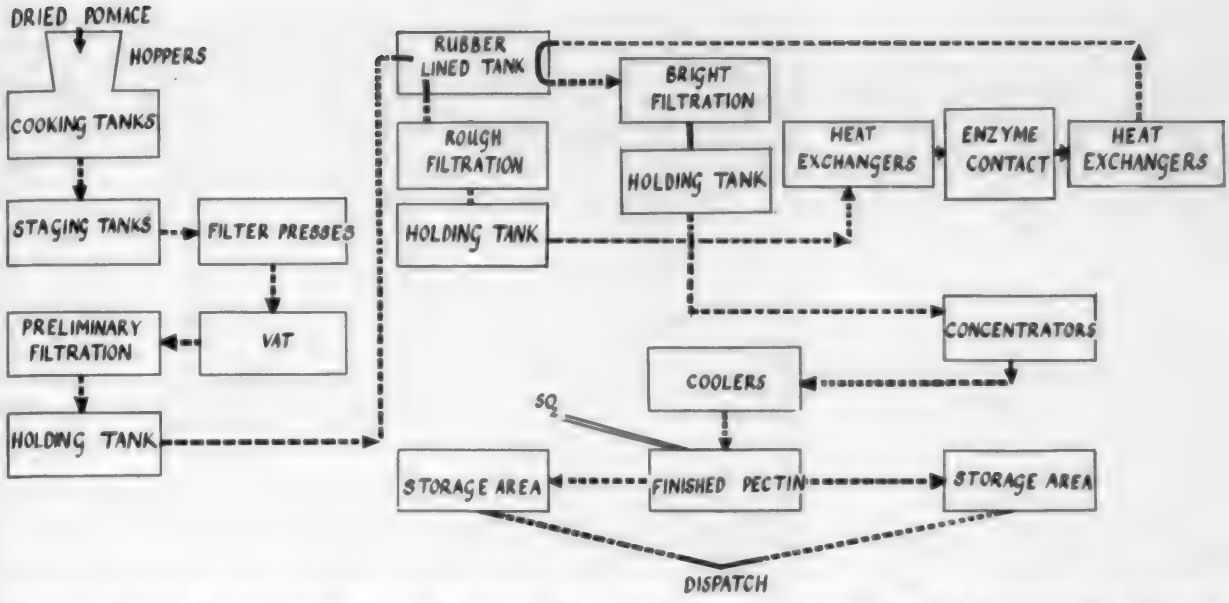
The next step is to press the juice from the heated pulp. Grouped below the staging tanks are the extraction presses specially adapted for pectin manufacture. They work on the rack and cloth principle, resembling the presses often used in cider extraction but with plates of coarse and fine stainless steel gauze instead of cloth in the frames of the filter plate. The press itself is a horizontal assembly of frames holding the stainless steel plates so that the space between each pair of plates forms a natural filter chamber. The solution is suctioned off from the bottom of the staging tank and delivered to these presses for extraction. The solution enters the filter chambers through feed ports and the press is closed up so that the liquor is forced through the gauze plates leaving the insoluble solids in the filter chambers. The extracted clear solution flows through outlets at the bottom of the press. After the preliminary extraction, the porous cake remaining in the filter chambers acts as a filter aid to the rest of the solution.

**Filtration**

The extracted liquor flows from the press into a travelling trough on the floor below and is conveyed into a common collecting trough serving all the presses. After the extraction process has been completed, the filter presses are opened, the dry cake drops on to trolleys beneath the press and is taken away to be processed for animal foods.

From the collecting trough the liquor is delivered to a collecting vat on the floor below, and then undergoes a preliminary filtration. The filtered pectin is held in a glass-lined collecting tank and pumped back up to the top of the building into a rubber-lined receiving tank.

The product at this stage is a liquor which has been extracted from the pomace and roughly filtered. It is at this stage that the weak pectin liquor is treated with activated carbon in order to remove colour and residual apple flavours. Because of the viscous,




**Flowsheet showing the various stages of pectin production from the first extraction process, which is fundamentally a hydrolysis of the protopectin in pomace into a soluble form, to final concentration and cooling. Pectin manufacture is essentially a controlled acid hydrolysis process.**

colloidal nature of pectin in solution, *Metafilters* are thought to be the most suitable filters. In this type of equipment, filtration of fine solid impurities is achieved by columns of metal discs which are maintained in spaced relationship by specially shaped surface patterns. The special feature of the construction is its suitability for the establishment of a uniform pre-coating of filter-aid powder, itself filtered out of a suspension made in the liquid to be purified. The design of the apparatus ensures that this "filter bed" is firmly in place and it serves to remove very much finer particles giving a clear filtrate. The state of the solution is examined through an inspection eyepiece. From the receiving tank, the liquor is pumped into the *Metafilters* for rough filtration at the same time picking up the filter aid (activated earth or kieselguhr) from a special induction system. After the rough filtration, the liquor is collected in another rubber-lined tank on the floor below to await de-starching. It is pumped from the tank through a heat exchanger (there is an optimum temperature for this stage of the process) where it is adjusted to the necessary temperature and then passed through to a smaller rubber-lined tank for contact with a diastatic enzyme solution to destroy residual starch which would otherwise impair the clarity of the ultimate product. The de-starched liquor is now ready for bright filtering, but as this is best done at an elevated temperature it must now pass through another heat exchanger before being pumped to a separate compartment of the tank feeding the *Metafilters* and subsequent bright filtering. After filtration the liquor is collected again in rubber-lined tanks which feed the concentrators.

**HEAT EXCHANGERS. Before de-starching the liquor must be adjusted to the optimum temperature for this process. After the residual starch has been destroyed the liquor must again pass through a heat exchanger to raise its temperature to one suitable for bright filtration.**

**Concentration**

Concentration is a multiple effect process, the concentrators operating on pass-out steam from the factory turbine plant. The liquor is first passed through a bank of concentrators on one side of a gallery and then through others situated on the opposite side. After it has been concentrated to a thick syrup, the pectin must be cooled down to a temperature sufficiently stable for storage so it is passed through tube coolers, the cooling medium being water passing over the cooler on its way up to the storage tanks. As the concentrate is discharged ready for storage, the desired amount of sulphur dioxide is added and mixed in to preserve it.

The finished pectin is pumped into one of two storage areas; either a range of rubber-lined tanks or a series of large vats. Dispatch is from the rubber-lined tanks, and when necessary the pectin is transferred to these from the vats. A manifold system of glass pipes leads from tanks to the storage bay so that the pectin can be pumped into casks or tankers. While some of the pectin is still sold in casks, most of it is loaded by bulk on to transport tankers of light gauge stainless steel or smaller glass-lined mild steel tankers of capacities ranging from 1,000 to 3,000 gal. which cover the country from Scotland to the south coast.

Samples of each batch are tested for purity, quality and uniformity. Five grades of pectin are marketed by the company: a standard grade, special grades for light and darker products, slow set and powdered pectin, the latter the result of dehydrating the standard grade.

In addition to the standard 5X pectin, which is a relatively fast-setting product, William Evans have developed a special slow-setting pectin for use by manufacturers of the confectionery jams which are normally packed in 7 lb., 14 lb., or even 28 lb. containers. This pectin sets at a much lower temperature, therefore jam intended to be filled into bulk containers can be poured at about 160°F. without any risk of pre-setting, thus obviating the discoloration which tends to occur in these larger packs when the jam is poured at a high temperature.

**CONCENTRATION. The filtered pectin solution is passed through banks of concentrators on both sides of this gallery. After concentration it passes through tube coolers and, after the addition of $SO_2$, is subsequently discharged to storage.**

During prolonged storage, all liquid pectin tends to become slower-setting due to partial hydrolysis of the pectin molecule; by controlling this hydrolysis the company have evolved a method by which the effect caused by long ageing can be reproduced at the time of actual manufacture. The only special care which is needed in using slow-set pectin is to re-adjust the *p*H to a slightly lower level than would normally be used, as slow-set pectin has a lower optimum *p*H for setting than ordinary pectin.

A more recent addition to the range of products made from the apple by the company is *Pecta Purée* which is made from apple pomace by a process patented in 1952. The product is used as a base for thick sauce and chutney and, unlike apple pulp which it replaces in such products, it does not vary in consistency and the particle size is so small that separation is prevented.

The process consists of cooking the pomace in an alkaline solution in order to convert the pectin into soluble sodium pectate and to soften the tissue. On re-acidification, insoluble pectic acid and calcium pectate is precipitated within the interstices of the apple tissue. The product is then sieved and homogenised and is either preserved in sulphur dioxide or with acetic acid.

Sauce made with *Pecta Purée* has the distinctive property of leaving the neck of the bottle clean after pouring instead of leaving a continuous gummy film. This is due mainly to the calcium pectate and pectic acid gels which are broken into fine particles by sieving and homogenisation.

The grade or strength of pectin is the measure of its ability to form a jelly with a given amount of sugar and acid. Since by Statutory Regulation all jams in this country must normally contain 68·5% of soluble solids as a minimum, the amount of pectin required to form a jelly with this soluble solids content depends upon its quality, and this is generally referred to as the "grade." A normal commercial liquid pectin is designated "5 grade," which means that one part of pectin will set 5 parts of sugar to a firm jelly when made up to produce $\frac{100 \times 5}{68{\cdot}5} = 7{\cdot}3$ parts. It is import-

ant to realise that this jelly is formed only over a certain *p*H range. Outside this range the mixture may be a syrup: within the range the jelly strength rises to a maximum and then falls away again.

**Uses of pectin**

Although pectin is chiefly used in jam manufacture, where its gelling properties when cooked with sugars and fruit acids makes it the most satisfactory method of securing setting, it has other important uses in the food industry, such as for chocolate fruit centres, confectionery, ice cream, fruit jellies for flans and piping, meringues, whipped creams, butter creams, icings, glazes and so on. The addition of pectin helps to prevent separation in squashes and aids in holding the foam in carbonated beverages; it helps to keep processed cheese fresh and gives it greater water holding capacity; when added to milk it prevents a heavy curd and acts as an emulsifier and thickener; in mince meat pectin thickens and jellies the juices.

Jellies are made by either the hot method or as a cold setting syrup. Recipes for these are as follows:

*Hot method*

| | parts |
|---|---|
| Grade 5x Pectin .. | 15 |
| Sugar .. .. .. | 74 |
| Water .. .. .. | 33 |
| Buffer solution .. | 4 |

The buffer solution contains 3% citric acid and 4% monosodium citrate.

The ingredients are all boiled down together to produce 110 parts and then poured into moulds or on to a flat slab up to a thickness of say ⅛ in. The jelly is left for 1 to 24 hr. before it is ready to be cut into the required shapes.

The following formulæ are for the cold setting syrup.

| | A | B | C |
|---|---|---|---|
| Grade 5x Pectin .. | 75 | 75 | 75 |
| Sugar .. .. | 300 | 165 | 165 |
| Water .. .. | 120 | 90 | 75 |
| Glucose .. .. | — | 165 | — |
| Invert sugar .. | — | — | 180 |
| Sodium acetate .. | 1 | 1 | 1 |

The ingredients are mixed and boiled down to 440 parts, resulting in a syrup which will keep almost indefinitely without fermenting or jellying. When it is desired to make a jelly, the required amount of syrup is warmed slightly to about 100°F. and ½ oz. of a 5% solution of citric or tartaric acid is added to each 1 lb. weight. The whole is well stirred and poured into moulds, into thin layers to be cut for decorative purposes or on to fruits in pastries to make flans. A slight increase in the amount of acid will increase the setting time and *vice versa*. Colour and flavourings may be added to the boil in the case of both the hot method and the cold setting syrup. In the latter method, they may also be added with the acid.

Up to 10% of cold setting syrup can be added to egg white (*e.g.* as in meringue mixtures) before beating and to many other bakery and confectionery icings and fillings such as whipped or plain creams, butter cream icing, chocolate fudge, etc. It can be stirred into melted chocolate (equal quantities of each) to give a pleasant chocolate spread.

SOME SUPPLIERS OF EQUIPMENT

Vessels, tanks and hoppers: *Frederick Braby and Co., Ltd.; London Aluminium Co., Ltd.; British Tyre and Rubber Co.*
Pumps: *Girdlestone Pumps, Ltd.; Mono Pumps, Ltd.; Gwynne Pumps, Ltd.*
Metafilters: *The Metafiltration Co., Ltd.*
Heat exchangers: *A.P.V. Co., Ltd.*
Concentrators: *George Scott and Co. (London), Ltd.*
Enzymes: *Norman Evans and Rais, Ltd.*
Kieselguhr: *F. W. Berk and Co., Ltd.*

**FILLING. Although a certain amount of pectin is still sold in casks, most of it is loaded in bulk on to transport tankers.**

## Corrosion of Tomato Purée Cans

During the Italian tomato processing campaigns of 1953 and 1954, a number of cases were encountered where non-lacquered cans containing tomato purée were found to have corroded, mostly at the lid. These cases were investigated by the Food Canning Research Institute at Parma, where tests with tomato purée cans were carried out under different conditions of processing and cooling. According to G. Capuano (*Notiziario Tecnico Industriale dell' Imballaggio*, 1955, 3), the results suggest that it is desirable for non-lacquered tomato cans to be cooled rapidly. As corrosion is more intense at high temperatures, the rapid cooling process may be interrupted at a temperature of about 40°C. to avoid external rust formation. If it is not possible to cool rapidly, it is in any case advisable not to turn the cans after the sealing. If that cannot be avoided, it is imperative to ensure by other means a reliable sterilisation of the lid before sealing.

★Vacuum Oil Co. has issued a new technical booklet entitled "Refrigerator Lubrication." It opens with a discussion about general principles of refrigeration and then goes on to deal with general aspects of the construction and operation of refrigerating circuit units, the lubrication of compressors and the compatibility of various refrigerants with lubricating oils.

# The Brewing Industry

By W. A. Whitley

(*Truman, Hanbury, Buxton and Co., Ltd.*)

**Mechanisation is gaining ground throughout the brewing industry, from the use of hop-picking machines to the development of bulk handling techniques and newer plant cleaning and sterilising methods. New varieties of disease-resistant hops and higher yielding barleys more suited to mechanical harvesting are attracting attention. Among recent studies in brewing science, the influence of mashing conditions on wort quality is being investigated. Microbiological studies during the year have included work on wild yeasts, probably the most common cause of beer spoilage in this country. Future trends in brewing foreseen by the author include changing mashing procedures, the greater use of bulk handling and plastic pipelines, the development of larger bottling units to suit the current demand for bottled beers, and a trend towards canned beer.**

### Changes due to mechanisation

SINCE the brewing industry is so closely linked with agriculture, it is natural that increasing mechanisation on the farm will have its effect on the old established methods and materials of an art which has changed surprisingly little through the centuries. The introduction of the combine harvester has probably been responsible for more changes than any other single factor in recent years. The number of these machines in use has increased from about 1,000 in 1942 to well over 22,000 last year. This has meant that provision has had to be made for the storage of large quantities of grain, either on the farm or at the maltings, and since barley may be combined at any moisture content up to about 35%, the problem of drying and its attendant difficulties has also arisen, as the corn cannot safely be stored until the moisture content has been reduced to 11 or 12%. Like the other old "craft" industries the decreasing manpower is making itself felt, particularly in the malting section, with the result that many projects involving bulk handling and automatic process control are now under way. Modern maltings are designed for bulk delivery and handling right through the various stages—drying or sweating, germinating which may be done on floors which are mechanically turned or in drums with controlled temperature and humidity, kilning on automatic oil firing, and finally, storage till required at the brewery, in silos.

Where the brewery is situated at some distance from the maltings the question of transport has had to be considered in terms of recent developments, and the present trend is towards malt delivery in hopper wagons which can be emptied by suction or gravity, rather than the older method involving the handling of sacks with the consequent extra labour required.

One of the most successful examples of bulk handling has been in the delivery and storage of sugar and caramel. Previously it was customary for sugars to be delivered in pails or drums holding from 1 to 5 cwt. Apart from the labour required to handle these packages, dissolving facilities were required, and in winter, when the contents were probably solid, an unknown amount of steam was required for dissolving and the process could take hours. Now the material arrives in a tanker at 110°/120°F. and is pumped to a storage tank where this temperature can be maintained, usually by provision of internal coils or a thermostatically controlled water jacket. A 13-ton tanker can be unloaded in about ½ hr. and the sugar in the tank is sufficiently fluid to be run to the point of utilisation, thus saving a great deal of manhandling and a considerable amount of time.

The most rapid progress in bulk handling in the brewing industry has probably been in the transport of beer itself. Whereas previously large numbers of hogsheads were employed in the transport of beer for bottling, nearly all brewers now use tankers which may hold up to 80 barrels. They may be used for road or rail transport, and with the various agents now available for cold sterilisation it is possible to achieve a degree of sterility which was practically impossible with the wooden casks whose bulk and weight made freight charges high in proportion to the amount of beer carried.

### Hop picking

The hop-picking machine, like the combine harvester, is another stage in the mechanisation of the industry which has come to stay. In this case, however, there is an element of urgency in its adoption, since it is becoming increasingly difficult to get hop-pickers, and the days when East End families moved to the hop gardens for their annual holiday have ended. The number of machines has grown from about a dozen five years ago to over 100 now in use and there has been much improve-

ment in their efficiency. Although the machine picks cleaner, there is still a fair amount of breakage, with consequent loss of some resin from the hop. Some estimates put the loss as high as 10%. However, in view of the labour situation, the use of picking machines will continue to increase as it is possible to make a considerable reduction in harvesting expenses by substituting a machine with about 25 operatives for some 300 to 400 pickers. In the wake of the machine comes another problem—that of drying, since machine-picked hops require more gentle handling on the way to the kiln, and being no longer whole cones, but a mixture with broken petals, tend to pack more closely on the kiln, thus upsetting the normal air speed and temperature requirements. By installing belt elevators from machine to kiln, further breakage of the cones is reduced and it is possible that the drier of the future will be of the continuous type with infra-red rays directed on to the moving belt.

**New varieties of hops . . .**

The extensive cultivation of new varieties of hops is being carried out chiefly to combat the spread of that devastating disease, progressive Verticillium wilt, but also to find hops suitable for machine picking. Though much work has been done in this direction, few of the new varieties have so far proved acceptable to the brewer. However, one interesting feature of the new varieties is that they have in general, dense, tough cones which do not shatter to the same extent as the old commercial types such as Fuggles, when machine-picked, and one variety, Sunshine, has proved to be a good machine picker as well as being disease resistant. As with other materials used in the brewing process, rising costs call for more efficient use of hops, and work is being done on the ultrasonic irradiation of wort with a view to improving hop extraction and thus reducing the hop rate required to give the necessary flavour to the finished beer. The interest in the more complete utilisation of hop resins is shown by the work being done in Sweden and Germany, and reported at the Fifth European Brewery Convention held at Baden-Baden in May last year.

**. . . and barleys**

With the combine harvester has come the demand for barleys more suited to that system of harvesting than are the older types of malting barleys, with the result that there has been an increase in the varieties available, especially Scandinavian types, in spite of a demand for malting quality. The tendency is for the farmers to produce quantity rather than quality, so that the traditional varieties of malting barley such as Spratt-Archer and Plumage-Archer, etc., are being replaced by high-yielding varieties such as Proctor and Carlsberg. One of the features of the past season has been the predominance of Proctor, which is a Kenia x Plumage-Archer cross, and it has been estimated that this particular variety has provided some 50-60% of the barley crop. The quality of this barley last year was outstanding, and extensive brewing trials have so far seemed to indicate that it makes very useful malting material giving higher extract than the Spratt-Archer with which it was compared.

**Plant cleaning and sterilisation**

Much progress has been made in the cleaning and sterilisation of brewery plant. Since during the war years all the resources of a brewery were directed to keeping up production, very little was done in the way of reconstruction. In the replanning and modernisation of equipment much thought has been given to methods which will combine efficiency in cleaning with saving in labour and materials. This is particularly noticeable in the design of pipe lines, which are an unavoidable feature of the process, and it is common practice to construct these lines in such a way that a detergent can be circulated through the system, after a bullet brush has been put through to remove any adhering matter. The introduction of quaternary ammonium compounds has enabled this system to be followed up by cold sterilisation, particularly in places like the cold store where steaming of the pipe lines is undesirable, if not useless. Cold sterilisation is proving particularly useful in the bottling plant and especially in the case of filling machines which are difficult to deal with owing to the number of moving parts and the impossibility of steaming with some types. Bottle washing machines are becoming more fully mechanised with the introduction of uncrating machinery, and this is naturally followed by mechanical packing of the filled bottles.

**Recent trends in brewing science**

An enormous amount of work is being carried out in laboratories connected with the industry both here and abroad. The setting up of the Brewing Industry Research Foundation at Nutfield marked the beginning of a new attack on many of the problems facing the industry. While much of the work being done there is of a fundamental nature, there is a growing output of material of direct interest to the brewer. An extensive programme has been carried out in connection with the Proctor barley already mentioned and, with Spratt-Archer as a control, a detailed comparison of the barleys and the malts made from them, has been undertaken. Not only was a complete analysis of the individual sugars, dextrin and starch carried out, but brewing trials were also made in the Foundation's experimental brewery. This plant is also being used for a study of the mashing process and, using the modern techniques of chromatography, it is possible to follow the influence of mashing conditions on wort quality. Beers also have been analysed chromatographically and wide variations have been found in the carbohydrate composition. Various yeasts from the National Collection of Yeast Cultures, which is now housed at the Foundation, have been used to study the manner in which they remove the carbohydrates from wort. The

nitrogenous constituents of wort and beer have been included in the survey and this has led to the examination of the composition of chill and oxidation hazes in beer, with evidence forthcoming to show that the haze consists of a tannin-protein complex. It was observed during this work that metals present in traces in the beer became concentrated in the haze. The non-starchy polysaccharides of cereal grains have been the subject of a survey made at the Heriot-Watt College, Edinburgh, and when the results of the enzymolysis studies now in progress are complete, the changes involved in the modification of malt should be more fully understood. The importance of the work on barley and malt, both from a fundamental and practical viewpoint, is well illustrated by the number of papers devoted to the subject at last year's European Brewery Convention.

In collaboration with Wye College and East Malling Research Station, much work is being done to solve the various problems connected with hops. From the brewer's point of view, the urgency in connection with the breeding of new varieties is well illustrated by the figures given for the area affected by wilt. Nearly 200 farms are now infected, which means nearly 3,000 acres or about one-seventh of the total hop acreage in the country. The future of much of this land will depend on the production of wilt-resistant varieties which are acceptable to the brewer, and extensive trials of several of these have been undertaken on both a large and small scale. The assessment of the quality of hops by chemical analyses continues to provide a fruitful field for research and many papers have been published on the chemistry of hops. Recent work in this field concerns the changes undergone by humulone and lupulone during the brewing process, and it has been established that a considerable part of the deterioration of hops in storage is due to oxidation, a point of immense practical importance.

Dormancy in barley is receiving much attention. Work is in progress to determine the factors contributing to this condition and experiments are being carried out to discover the effect of various substances in the steeping water, with a view to increasing the germination of newly harvested barleys and so eliminating the normal process of drying and storage. Consideration has also been given to the methods of carrying out germination tests and a reliable laboratory test for germinative capacity has been found. The changes undergone by the carbohydrate constituents of barley have been the subject of several papers which have followed them from the ripening stage through to the finished malt. The availability of modern techniques has increased the interest taken in the different nitrogenous substances present in barley, malt wort and beer, and it has been suggested that ultra-centrifugal analysis might be used to judge the malting qualities of a barley.

**Brewing microbiology**

Brewing microbiology has been receiving considerable attention during the past year. In Edinburgh, the Society for Applied Bacteriology held a symposium on yeasts and alcoholic fermentations and the American Society of Brewing Chemists devoted most of their annual meeting to microbiology. Papers have also come from the Research Foundation where work is being done on wild yeasts, probably the most common cause of beer spoilage in this country.

One of the main problems facing the microbiologist in the brewery when examining the yeast for contamination, has been to find a means of suppressing the growth of the culture yeast in order to enumerate the number of bacteria present. The discovery of antibiotics immediately opened up possibilities in this direction and it is now a simple matter to inhibit the growth of yeast and yet permit growth of the relatively small numbers of bacteria. By using such differential media and altering cultural conditions it is also possible to distinguish between the types of bacteria found in brewing materials. Thus Gram-negative rods can be separated from the potentially more dangerous Gram-positive lactic acid rods which might otherwise remain undetected. Differentiation among yeast genera and yeast strains requires much more information about yeast nutrition and physiology before it will be possible to formulate a fairly reliable and simple procedure which will detect and measure the numbers of foreign yeasts in a given sample of brewers' pitching yeast. Nevertheless, much information of interest and use has been published about British pitching yeast and the survey has not only included the species of wild yeasts occurring, but also the types found in the draught beer. In addition, giant colony characteristics have been utilised in differentiating among the strains found in the pitching yeast from various breweries. Work continues on the factors affecting yeast flocculation, and although it has been shown that some types are under genetic control, none of the views about yeast flocculation have met with general acceptance and there is still disagreement even about the precise facts awaiting explanation. However, the matter is one of practical importance since a flocculent type of yeast gives a less attenuated beer at racking than does a non-flocculent. The nutritional requirements of brewing micro-organisms have been the subject of careful study and it is possible that, as in the case of the lactic acid bacteria, only a type with certain nutritional requirements can compete successfully with a given yeast strain for the nutrients required for growth. On the practical side, however, it is important to keep the number of bacteria introduced with the pitching yeast, to a minimum, and experiments have shown that it is more effective to use an antibiotic in place of tartaric or phosphoric acid for yeast washing. If instead of washing, the substance is added with the pitching yeast, the numbers of bacteria continue to fall

**FLOOR MALTING**

*One of the most modern floor maltings in this country is operated at Grimsby by Sandars and Co., Ltd. Above* (left) *is a view of the bottom of the barley silos showing the air vents and conveyor equipment.* (Right) *The steep room houses a battery of six 75 quarter steeps. Each wetting of barley is transferred twice from one cistern to another during the steeping process. The picture on the right shows one of the 24 germinating bays. The grain is spread out and turned mechanically and the "pieces" can also be thinned out or thickened up at will. The turning machine is shown here in position ready to move down the pieces.*

throughout the fermentation and any unchanged antibiotic in the beer is removed by the filter aids employed prior to bottling.

It has also been demonstrated that gamma irradiation can be used for the pasteurisation of beer, but the method is not yet practicable owing to the adverse effect on flavour and the action on the glass of the bottles.

**Analysis**

Methods of assessing the degree of modification in malts continue to rouse interest and among those suggested for use are the measurement of the force required to crush the corns, wort viscosity, and mashing at different temperatures. The substitution of the refractometer for the specific gravity bottle in the determination of extract has been proposed, and there have been indications that the present solution factors require revision.

The use of the anthrone reaction in the estimation of sugars has been investigated by several workers and methods of wort and beer analysis, based on chromatography, which are suitable for routine work have been evolved. Spray reagents have been modified to meet the requirements of a dipping technique and solvent compositions have been developed for the rapid chromatographic resolution of amino acids.

Several methods have been published for the estimation of trace metals in biological materials, and the Analysis Committee of the Institute of Brewing has issued fresh recommendations regarding the estimation of arsenic in coals.

**Possible future trends**

The continued increase in the sales of bottled beer at the expense of draught will cause a trend towards larger and fully automatic washing and bottling units, with layouts which will facilitate cleaning pipelines and the like with the minimum of dismantling. Bulk handling and storage of most raw materials will become general. In many cases plastic will replace some of the metals in present use for pipe lines and rubber hoses will largely disappear.

There are some indications that the limit has been reached in the use of low-nitrogen barleys which, in low gravity beers of to-day, give insufficient assimilable nitrogen for yeast nutrition. The present mashing system was evolved for using well modified malts made from mature barley grown for quality. In view of the lesser modification and quality of present-day combined barleys, a change in the mashing procedure,

(*Turn to page* 147)

# The Baking Industry

By D. W. E. Axford, Ruth Bennett, M. A. Cookson and J. B. M. Coppock

(*British Baking Industries Research Association*)

**During 1955 there was a tendency for the productive power of the industry to become even more concentrated, with large milling interests in particular becoming active buyers of bakeries. In the industry as a whole, production was well maintained. The rate of fall of bread sales was greatly slowed, as indicated by the consumption of National Flour, which was only 0·5% below the 1954 level. Biscuit production figures were very encouraging, showing an increase of 2·25% on the corresponding figures for 1954. There was much less legislation affecting the industry than in the previous year, although the new hygiene regulations were finally formulated and, following the McCance-Widdowson report, a panel was set up to examine the nutritive value of various flours.**

## Food additives

THE problem of food additives in general has continued to arouse much comment and discussion during the past year. At the moment, the many countries which have legislated in respect of these additives differ widely in their views as to what is or is not acceptable, and this frequently complicates the import and export of foodstuffs. A joint conference of the Food and Agriculture Organisation and the World Health Organisation has recommended international action on the use of food additives, and this would undoubtedly be most desirable. These difficulties are well illustrated by the recent alterations in recommended food colours in this country and in those permitted in the U.S.A. The previously permitted dyes Orange 1 and 2 and Red 32 have now been removed from the U.S.A. list. The British Food Standards Committee Supplementary Report on Colouring Matters has also recommended some changes in their provisional list, mainly in brown and black colourings, and certain coloured metallic decorations have been added. These changes still leave considerable differences in the food colours to be permitted for use in the two countries.

The procedures for the appraisal of the toxicity of chemicals in foods and for evaluating their safety for use as additives are clearly the basis for this type of legislation, and of several articles appearing during the year might be mentioned a symposium dealing at length with techniques employed at present by the U.S. Food and Drug Administration.[1]

The revised recommendations for limits for arsenic in foods made by the Food Standards Committee were published. In these it was recommended that for foodstuffs of interest to the baking industry the arsenic content should not exceed 1 p.p.m. (or 1·3 p.p.m. arsenious oxide). There are edible products to which the general limits cannot at present apply and these are mainly concentrated foods and food adjuncts.

## Hygiene

The new Food Hygiene Regulations, 1955, came into force on January 1, 1956, and it will be interesting to see how the various predictions and anticipations of their effect on the industry are verified.

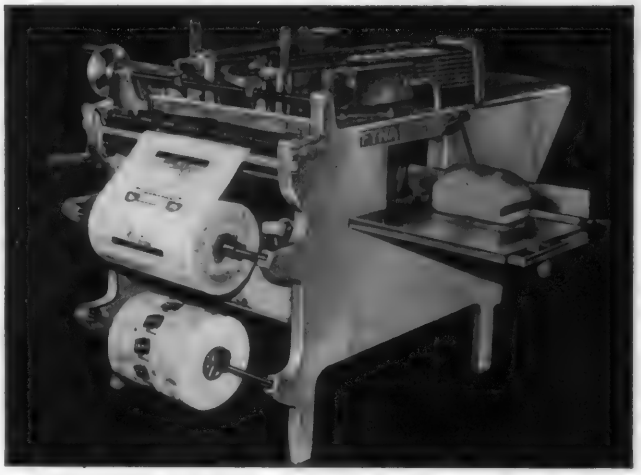
Last year was notable for the occurrence of a difficult hygiene problem involving the use of Chinese frozen egg and dried albumen. Outbreaks of paratyphoid fever were caused by salmonella in these products infecting certain foods. There appear to be two essential requirements for removing the possibility of these infections, the first being adequate heat treatment to kill the organisms and the second good hygiene to prevent cross-infection. Depending on the use to which these egg products are put, normal bakery processes may or may not provide the heat treatment desirable (*e.g.* butter cream, royal icings and meringue toppings will not in general receive the required treatment). Editorial comment in the November 26 issue of the *British Medical Journal*, which contained an article on outbreaks of paratyphoid fever associated with Chinese frozen egg, stressed the importance of preventing contamination of uncooked commodities by utensils contaminated by such egg, and that the food handlers' standards of personal hygiene were also of great importance.

As far as dried albumen was concerned, the Albumen Advisory Committee stated in October that negative bacteriological tests on limited samples were not conclusive evidence that the bulk was fit for use in food and they made certain recommendations for its safe usage. Further releases of Chinese dried albumen by the importers were temporarily stopped pending investigation into a suitable method of sterilisation.

At the first international meeting of the Society for Applied Bacteriology last July, varieties of food poisoning were considered in a symposium on "Food Microbiology and Public Health." The

difficulties of any hygiene regulations were brought out by the official findings described in the Ministry of Health Report on Public Health and Medical Subjects No. 96, on an outbreak of food-poisoning in meat pies, which showed that even where the standard of hygiene was very high, it was still possible for fatal consequences to ensue; this report also included a series of recommendations for baking practice. Furthermore, infection may not originate in the food-preparing premises and it has been pointed out[2] that the general public is rather apt to think that the sole responsibility for keeping food safe ends at the shopkeeper's door, whereas it too has at least an equal responsibility.

The difficulties of avoiding contamination of baked goods have been described in an article[3] in which various control measures to prevent infection were described and legal aspects considered. The use of ultra-violet light for the control of bacteria and moulds involves many practical considerations;[4] among these are the irradiation intensities necessary to achieve given percentage destructions for various micro-organisms and their dependence on relative humidity. The careless and indiscriminate use of insecticide fumigating devices has occasioned some comment in the British and American medical journals and it is worth drawing attention to the potential dangers involved if they are indiscriminately used in premises where food is made or handled.



**With a speed of from 600 to 800 packages per hr., the "Fyna" automatic bread wrapper is claimed by its makers Kneeda Mfg. Co. Ltd., to be one of the most speedy, compact and versatile of its kind. Because it uses rolls instead of sheets the machine saves 15% in paper.**

### Nutrition

The publication of the McCance-Widdowson report, which was referred to in last year's review, has occasioned considerable discussion. In the Sanderson-Wells lecture, Prof. McCance amplified his reasons for concluding that the extraction rate of flour was immaterial to general well-being. However, a lengthy correspondence in the columns of the *Lancet* has shown that his conclusions have not as yet won universal acceptance.[5] Following the appearance of this report, the Government set up a committee of impartial authorities under Sir Henry Cohen to consider once again the whole question of extraction rate and nutritional value. The various trade associations of the baking industry agreed that a joint submission to this committee should be made by the B.B.I.R.A. —the first occasion on which such unified action has taken place.

A very clear analysis with examples of the different purposes of fortification in Britain of foodstuffs generally, and flour and bread in particular, has been given,[6] in which it was stressed that much fortification was introduced voluntarily by food manufacturers, and in which the objections to fortification were also discussed. An evaluation of the relative utilisation nutritionally of various iron compounds when used to enrich bread indicated that they are equivalent; it is of interest that ascorbic acid markedly enhanced absorption and utilisation of the iron.[7]

The importance of certain essential amino-acids in nutrition is well known, and during the last year further extensive investigations on the minimal daily requirements to man of some of these have been carried out.[8] These results include a figure of 1·69 g. for the safe daily intake (twice the highest observed minimum requirement) of lysine, which is an essential amino-acid in which bread is relatively deficient. It would require for example about 48 oz. of white bread to supply this amount of lysine, though of course other sources in the diet, particularly milk, are important contributors. Although in America there is much discussion on the fortification of bread with lysine, it is of interest that a recent U.S.A. census showed that the lowest income group of urban families consumed in their diet approximately 4 g. of lysine per day, an amount substantially above the safe intake quoted.

### Flour

The Canadian wheat crop in 1954 was not particularly good, 50% graded No. 4 Northern or better. Damp, immature and frosted wheat accounted for some de-grading. The change from the 1953 crop was less noticeable owing to the carry-over of wheat from it. The 1955 crop was better, 50% graded No. 2 Northern; milling quality and protein content were superior to 1954. Again there was a considerable carry-over, except in No. 1 grade.

In Eire, flour from the 1954 native grown harvest gave considerable trouble due to sprouting of the grain and to the high percentage of this wheat that, under Government instructions, had to be included in the bread flour grist. The result of this high alpha-amylase in the dough was damp crumb and definite streaks in the batch bread. Much work was done and suggestions made to overcome this excessive amylase

activity, though none was wholly successful. The dry weather in 1955 resulted in a good harvest, and diastatic activity of wheat and flour have been at a satisfactory level, so that despite the inclusion of 75% native wheat in the grist flour quality has been reasonably good.

Bread flours in other parts of the British Isles have maintained regular quality. They have occasionally been somewhat overtreated by oxidising agents for normal bakery practice, either due to the wheats used in the grist being of sufficient strength not to require much improvement or to an apparent lowering in the extraction rate[9] which was not adequately compensated for by reducing oxidising treatment. In passing it may be noted that, with the abandonment of the agene process, oxidising agents in common usage are chlorine dioxide and benzoyl peroxide for their bleaching effect, and chlorine dioxide, potassium bromate and ammonium persulphate for flour and dough improvement. It is also of interest to note that many of these flours showed less response to improvement by fat or other crumb-softening agents in breadmaking.

Cake flours of the type required for high ratio cakes have improved, especially since the desirability of extremely fine granulation has been appreciated. Work to discover those characteristics which go to make up good biscuit and cake flours has been continued. Articles have appeared discussing the properties of flour suitable for different types of biscuit,[10] and the significance of flour particle size in its effect on biscuit checking has been described.[11]

The particle size distributions of a series of American flours have been shown to be dependent on the variety and location of growth of the parent wheat and can be correlated with baking properties.[12] New developments in producing flour by impact milling have aroused considerable interest recently. This process enables the production of fine flour without damage to starch granules. Such flours are said to produce bread in higher yield with reduced staling characteristics, and also cakes of greater volume and finer texture. They appear as well to have improved keeping qualities and to be less liable to infestation.

The considerations involved in storing flour for various periods have been further discussed. Included in the general requirements for storage for normal periods, it is claimed to be most desirable that bread flours should be stored between 65-80°F., and relative humidity 60-70%, whereas cake flour should be stored between 68-72°F. and 60-70% relative humidity and can be kept for somewhat longer periods than bread flour.[13] The conditions of storage are more fully discussed in a paper describing original work[14] where it was shown that the stability of bread flours may be enhanced by decreasing extraction rate, not using oxidising improvers and reducing moisture content below the normal levels. An extensive investigation of the storage of flour for periods up to 27 years in gas-tight and non-gas-tight bins has shown that the deleterious effects on flour quality are also associated with changes in the flour fat and are dependent on the storage atmosphere.[15] An application of this sort of investigation is to be found in a study of the storage of cake-mixes,[16] where the rate of deterioration is dependent on the moisture content of the mix; mixes formulated with flour of not more than 7·4% moisture were generally quite resistant to deleterious ageing.

The use of enzymes in the baking industry has received increasing attention. Most of the work has concerned the amylases that are responsible for the breakdown of starch, particularly the amylases produced by fungal and bacterial activity. The subject has been reviewed in an article in the September issue of the *Journal of the Science of Food and Agriculture*, and the following points made. First, fungal amylases and proteases, unlike malt flour, can be added separately according to the requirements of the flour; secondly, fungal amylases increase gas production, produce less dextrin and have less liquefying action on the starch; thirdly, bacterial amylases are more thermostable, acting longer in the oven and producing excessive dextrins. A fundamental investigation of the action of wheat amylases on starch under the conditions of time and temperature as they exist during baking has been made.[17]

**Other ingredients**

February 20, 1955, saw the introduction of a National Milk loaf, ranking for subsidy, under the Bread (Amendment) Order, 1955, S.I. No. 221. The inclusion of skim milk powder in a basic bread formula has a depressant effect on loaf volume which must be corrected by the addition of fat or similar ingredient to make satisfactory bread. The use of skim milk powder in the baking industry has been reviewed from many aspects.[18]

There have been few significant advances in fat technology during the year. Several further papers on edible global spreads (*i.e.* alternatives to butter or margarine having spreadabilities practically independent of temperature) have appeared in the *Journal* of the American Oil Chemists' Society. The difficulties of finding suitable cocoa butter substitutes have also received attention. The properties, selection and preparation of the fats used for various purposes in biscuit manufacture have been considered[19] and new work has been reported on the effect of moisture on the stability to oxidative rancidity of fat in commercial biscuits[20] which has demonstrated the inhibiting effect of moisture on oxidative rancidity. Among several new analytical techniques for studying fat deterioration might be mentioned a new procedure for measuring the degree of reversion and rancidity of edible oils; this enables a carbonyl index to be assigned to each oil, which correlates with organoleptic assessment.[21]

The relative behaviour of the

emulsifying agents lecithin, GMS (glyceryl monostearate) and TEM (the diacetyl tartaric acid ester of monoglyceride) have been generally reviewed,[22] including new studies by X-ray methods,[23] in which it was found that the order of efficiency in bread was GMS greater than TEM which in turn was better than lecithin, and in which it appeared that the additives reduced the retrogradation of gelatinised starch in breadcrumb. Conflicting views on the desirability of using POEMS (polyoxyethylene monostearate) have continued to be expressed, but there should appear shortly an official pronouncement by the Preservatives Sub-Committee on this additive.

A D.S.I.R. Food Investigation Special Report (No. 60, 1955) has exhaustively discussed the whole subject of eggs and egg products, notably (1) the structure and composition of eggs, (2) physicochemical properties of egg, (3) methods of preservation, including the storage of shell eggs, the freezing and drying of whole eggs, and the drying of albumen, (4) the microbiology of shell, frozen and dried eggs, (5) keeping qualities and utilisation of frozen and dried egg, and of dried albumen and dried yolk, (6) legal requirements, supply and consumption. Recent advances in egg drying techniques have been described[24] and are said to improve the product's palatability, functional performance and storage stability, *e.g.* for dry-mixes. Freeze drying of albumen, yolk and whole egg had no detrimental effects on the functional properties of albumen, but impaired the properties of yolk and whole egg.[25] The difficult hygiene problem involved in the use of dried albumen has been referred to already.

**Advances in technology**

Interest in bulk storage and handling was fully maintained in 1955, and a number of articles on the subject have appeared. The problems involved in the bulk handling of sugar[26] and of flour[27] have been described, and a discussion given of the advantages and disadvantages of bulk storage to the baker.[28]

Deep-freezing and retardation of bakery goods have received great attention as these techniques enable more efficient use of labour with a corresponding easing of supply problems at peak times. These techniques are of particular importance in view of the impact of the provisions of the Night Baking Bill, but it is worth emphasising that deep-freezing and retardation are only some of the ways in which these difficulties can be overcome.[29]

Retardation permits a temporary delay between the making and baking of doughs and batters; retarding temperatures of about 38°F. and relative humidity of 85% have been suggested.[30] The size of the dough piece is of considerable importance in successful retardation, there being considerable difficulties in retarding the larger dough pieces required for bread. With small goods, however, extra yeast is desirable and the presence of fat facilitates longer retardation and also imimproves the quality of the final product. There has also been further use made of refrigerated puff pastry and some other flour confectionery.

The technical problems involved in the deep-freezing of baked products are greater and have been studied in considerable detail; the general conclusions have been summarised[31] as follows: (i) the product must be of good quality and fresh when frozen, (ii) it must be properly packaged, (iii) it must be rapidly frozen, (iv) storage should be at an even temperature of approx. 0°F., (v) defrosting should be as rapid as practicable. Among the articles concerned with bread, two in particular are worthy of mention;[32] they deal with the effect of different types of bread and packaging and of conditions of freezing, and with the acceptability of breads frozen under different conditions. In addition, the design of bread-freezing plants has been discussed.[33] Perhaps even more interest has been shown in the freezing of confectionery since bread occupies too much refrigeration space in relation to its selling price. The freezing of both the batter or the cake produced from it has been studied. Changes in batter structure while frozen result in poorer cake properties,[34] and the causes of this have been further investigated from the point of view of carbon dioxide loss which is reduced as the storage temperature is lowered.[35] The freezing and thawing of many varieties of cakes has been studied[36] and it has been found that softer and more tender cakes are obtained with higher proportions of sugar and by thawing at elevated temperatures; none of the cakes showed any ill-effects from freezing and thawing. The problem of choosing suitable packaging materials for employment in conjunction with deep-frozen goods has also received attention in several articles.

Although deep-freezing is being used by bakers essentially as a means of preserving freshness in baked goods, it will also reduce the likelihood of attack from micro-organisms. This latter object can also be achieved by irradiation, and much work has continued to be done on this during the past year. An authoritative document (D.S.I.R. Food Investigation Special Report No. 61) dealing exhaustively with all aspects of this subject has appeared. Public fears that irradiated foodstuffs might themselves become radio-active have been shown to be groundless, no induced radio-activity being detected even when using a 10 kilocurie Cobalt-60 source. Work has also been carried out to show that irradiation at the levels envisaged has little or no effect on the packaging materials involved. At the University of Michigan too high rates of dosage of gamma radiation on flour have been shown to produce slight deleterious effects on flour baking properties, but the dose rates necessary to kill flour pests seemed to be below these, although re-infestation may still be a problem.

The ferment or "brew" process originally developed in con-

nection with continuous mixing has recently been applied in the U.S.A. to normal batch bread-making processes. Many reports have appeared in the literature giving variations on the basic formula and method, and practical suggestions for working the system. The addition of skim milk powder or calcium carbonate has been recommended for buffering the broth, and the process can be used for brown, Vienna and rye breads, sweet rolls, etc. Several advantages are claimed for the ferment process, *e.g.* the saving in time and floor space as the dough is given only 30-40 min. in bulk before dividing, but it does not appear possible as yet to evaluate fully its practical merits.

The past year has seen the introduction of the so-called "Sleeping Baker." This consists of a thermostatically controlled water tank, a time-switch and switches for the automatic or manual operation of the mixer. Water is fed into the tempering tank at a pre-set time and, having reached the correct temperature, is automatically poured into the mixing bowl and the mixer mechanically switched on. The mixer automatically stops after a predetermined time, and the dough lies in the bowl for the required time until the baker comes in to mould and work-off. Another technical development which has aroused interest in the year is the use of packaged steam generators. These are standardised, shop-assembled boilers, mounted with their auxiliary equipment on a strong frame, which greatly simplifies installation, and it seems probable that the use of these will increase in the next few years. The subject of fuel economy and fuel usage generally has continued to receive great attention; the results of the first of a series of oven tests have been obtained,[37] enabling some accurate figures for the efficiencies of several ovens to be derived.

### Advances in basic science

The work referred to below is that which appeared to the authors to be of the greatest significance, but inevitably much interesting material has had to be omitted.

**Wheat fractions**. Wheat flour has been separated into two fractions by sieving, each being subjected to varying degrees of mechanical pressure to produce starch damage and finally recombined in order to investigate the effect of damage on dough properties. Better keeping bread resulted from the damaged flour, which required greater amounts of dough water. However, it failed to give satisfactory rusks or hard-sweet biscuits but did give better-looking wafers.[38] A more fundamental study of starch gels at various moisture contents, by X-ray diffraction, has appeared on the problem of staling.[39] Photomicrographic studies of wheat starches and the means by which enzymes attack them have been reported in a supplement to *Cereal Chemistry* (Osborne Medallist lecture, 1955). A technique for separating flour into gluten, starch, and tailings starch plus water solubles, and for combining these dried fractions to make satisfactory bread has been discussed.[40] The dry fractions combined on their own led to a 15% reduction in loaf-volume unless the normal addition of sodium chloride had been made. The lipid fraction of flour, which is normally difficult to extract in its entirety, has now been extracted to a greater extent than before by using water-saturated *n*-butanol.[41] This solvent, unlike others, does not entirely destroy the cohesive properties of the wheat proteins.

**Flour and bread improvement**. The physical characteristics of gluten and the reactive groups involved in oxidative improvement have been reviewed.[42] These groups are believed to be the sulphydryl groups of the relevant amino-acids, and improving agents exert their effects by acting on them, although the mechanism is still not definitely established. In this connection, a new technique has appeared for determining polarographically the sulphydryl contents of flours, and these have been related to the baking strengths of the flours. For example, tests with and without the addition of cysteine and potassium persulphate indicated that the ratio -SH/S-S may be a determining factor with regard to the improving action of persulphate.[43] The bleaching effect observed in an aeration process of bread improvement has been attributed to the action of unsaturated fat-oxidases, particularly lipoxidase. The simultaneous improvement is independent of lipoxidase but dependent on free access of molecular oxygen to the dough, as also is the bleaching action of the lipoxidase.[44] However, in this process, enzyme-active soya has been shown[45] to effect improvement and other work has established that in the presence of unsaturated fatty acids lipoxidases bring about a coupled oxidation of the sulphydryl compound glutathione.[16]

**Analytical**. A considerable number of papers of interest to those concerned with analytical methods in the baking industry were published last year, but it is only possible to refer to a few of them. Of considerable interest in the analysis of flours for various purposes might be mentioned, (*a*) the summary of the collaborative work on total nitrogen determination by the joint committee of the American Association of Official Agricultural Chemists and the American Oil Chemists Society, published in the *Journal* of the latter body in 1955, (*b*) a new procedure for the quantitative determination of bromate in flour, involving a further modification of Howe's method, and using a simplified amperometric technique,[47] and (*c*) a method for the determination of sodium bicarbonate in self-raising flours containing creta.[48] In the field of emulsifying agents, a method has appeared for the determination of monoglycerides in the presence of glycerol without their prior separation, and the technique is claimed to be more rapid and accurate than previous methods.[49] Attention is also drawn to a determination of polyethylene glycol mono-oleate by absorptiometry.[50] In connection with the examination of

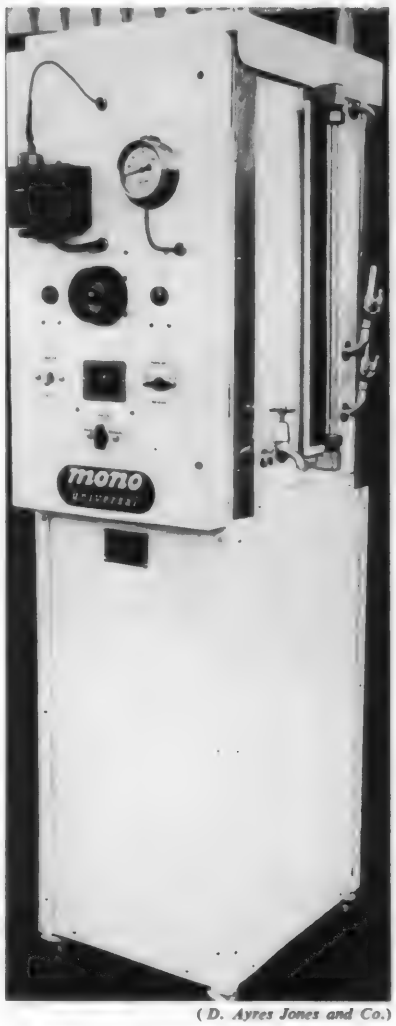
baked products themselves, some work has appeared describing the application of paper chromatography to the identification of several preservatives and volatile acids,[51] and a simplified method has been published for estimating DDT residues.[52] Reference has already been made in the section on wheat fractions to the determination of sulphydryl groups in flours,[43] and to an improved procedure for the extraction of total flour lipids.[41] Also mentioned, in the section on other ingredients, was a new method of measuring the degree of reversion and rancidity of edible oils.[21]

Before concluding this short review of the more fundamental work, a very interesting investigation into the structure and surface area of baked goods utilising proteolytic and diastatic digestion of the protein and starch portions respectively, is worthy of note.[53] Finally, more light has been thrown on the factors influencing the Maillard or "browning" reaction.[54]

**Meetings**

In addition to the usual American meetings of cereal and food technologists, there took place the 3rd International Bread Congress in Hamburg which produced much interesting new material. British authors presented several papers, among which, of particular interest to bakers, were contributions on "Efficiency in bread making" by J. Thomson and "Some present trends in the use of flour-testing instruments" by Ruth Bennett.

The quadrennial International Bakers' Exhibition held in London was highly successful, and among several interesting features might be mentioned the extent to which equipment makers have introduced machinery of use to the small baker.




(*D. Ayres Jones and Co.*)

**The "Sleeping Baker"**

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## Progress in the Brewing Industry

(*Continued from page 141*)

possibly on the lines of semi-decoction, will be necessary to make best use of the materials likely to be available in the future.

Canned beer will probably find a place in the home market as it becomes obvious how much less space such containers require in a domestic refrigerator or larder. This may be coupled with a demand for longer shelf life and chill-proofing, as neither characteristic can be attributed to British beer.

# The Dairy Industry

By A. W. Marsden, M.Sc., D.I.C., A.R.C.S., F.R.I.C.

(*Commonwealth Bureau of Dairy Science*)

**As in previous years, thousands of reports appeared in 1955 on research and developments in the dairy industry. Of this vast number only a few can be high-lighted in this progress report. In spite of the lifting of controls, the return to normal private trading and the competition of substitutes for dairy products such as margarine, the production of milk, butter, cheese and milk products remains at a high level. Much time, thought and money is being spent by those within the dairy industry to improve the quality and variety of their products, and to present them to the public in attractive and wholesome forms.**

## Production and trade

ALTHOUGH the annual world production of milk is not known, it is certainly well over 250 million tons and, therefore, is one of the world's most important foods. A large amount of this milk is consumed as liquid milk but the world's dairy industry is still largely based on butter, which is by far the most important dairy product. During 1955 milk production in many European countries declined somewhat but the consumption of fluid milk and cream was maintained, so that there was less milk available for manufacturing purposes.

Butter production fell by over 10% in Denmark and the Netherlands and even more so in Britain and Switzerland; only France had an increased figure. On the whole butter consumption was the same as in 1954 but there was slightly more consumed in Britain, Canada and the U.S.A. The large holdings of butter in cold storage in the U.S.A. decreased by about 30% during 1955, this being due to reduced production, increased consumption, and larger overseas' shipments. On the other hand, butter production and stocks in Australia and New Zealand were rather larger in 1955 than a year previously.

The private importing of Danish and Australian butter into Britain was resumed last summer after many years of controlled contracts. New Zealand butter imports were freed from government controls the previous summer. The present level of export prices compare favourably with those existing under the long-term contract but it will take at least a year before contract and free-import prices can be compared.

**A 1,750-gal. tanker used for bulk milk collection.**

The world production and stock of dried skim-milk was rather less in 1955 than in 1954. This was partly due to the large disposals from the U.S.A. stocks, these being over four times greater in 1954-55 than in the previous marketing year.

Cheese production has remained comparable with 1954 but there has been an increased demand in some countries for the "fancy" cheeses. Canned milk production has increased slightly with small rises or declines in different countries.

## Bulk milk collection

For generations milk has been collected from the dairy farm in cans, sometimes called churns. These have been of various shapes, sizes and materials during the years and some have been decidedly better than others. Recently, however, the idea of collecting milk in bulk from the farm has been advocated by many and this system has become well established in some areas in the U.S.A. and New Zealand. In Britain the bulk collection of chilled milk is being tried in three separate areas under rather different conditions—by the Scottish Milk Marketing Board near Kirkcudbright, by the Milk Marketing Board at Newbury and by Lord Rayleigh's farms in Essex.

There is no doubt that the sys-

tem has much in its favour. There is a major problem of the capital cost to the dairy farmer but a decided advantage to the milk collecting centre. The system might be difficult to operate in hot weather if cooling systems broke down or if unclean milk got into a 1,500 or 2,000 gal. collecting tank and the whole tankful had to be rejected. This method is being carefully studied from all aspects at the National Institute for Research in Dairying and its reports will be eagerly read by both dairy farmer and creamery manager. A preliminary report has already been issued on the Scottish area by the Scottish Milk Marketing Board.

**The automatic dairy**

Probably every dairyman dreams of a dairy factory which is wholly controlled from one central panel of instruments and is so fitted with automatic devices that few, if any, staff are required to operate it. As yet this plant has not been built but the nearest to it is the new bottling dairy built by the Express Dairy Co. (London), Ltd., and opened in 1955 by the Minister of Agriculture, Fisheries and Food. It handles 120,000 gal. of milk daily and is so equipped with mechanical handling devices, including fork trucks for loading crates, that the bottles are untouched by hand from the time they are collected from the doorstep empty until they return full. The bottles are decrated, passed to bottle washers, filling and capping machines, crating machines and then on fork trucks to the delivery lorries.

Automation in industry is not of course new. There are, however, many aspects to be considered as well as the purely mechanical ones. As has been pointed out in a recent article, there may be managerial and labour problems to be solved as well.[1] Not all managers may be willing to submit to the automatic control of machines, and the labour unions may fear redundancy. Both sides must be ready to learn new ways and, if need be, to compromise.

**"Paraflow" pasteurisers at the Express Dairy's Morden bottling plant. In the background are some of the stainless steel milk storage tanks.**

**Determination of butterfat**

Several countries have in recent years been modifying their butyrometric methods of estimating the butterfat content of milk, cream, cheese, etc. In 1955 the British Standards Institution issued a new edition of B.S. 696, Parts 1 and 2, covering the Gerber apparatus and methods. The main change is in the capacity of the milk pipette which is now specified to deliver 10·94 ml. of water under certain conditions instead of 11·04 ml. as formerly. The temperature is changed from 68°C. to 65°C. for the adjustment of the butyrometers before reading.

The reasons for these various modifications of this old-established method are given by Crocker *et al.*[2] These are based on the findings in a number of laboratories by members of the B.S.I. Committee responsible for the revision. A very complete review of the Gerber method has been given by Bakalor.[3]

**Evaporating milk**

During recent years there have been a number of references to low-temperature evaporating processes in the dairy industry, especially in the U.S.A. These have mainly been in connection with concentrated milk for the liquid milk market, the flavour of such evaporated milks, after dilution, being claimed to be almost the same as that of normal milk. There is little concrete information about the large-scale production of such concentrating processes but a recent American report[4] gives some details. Skim-milk is evaporated at 85°F. using the high pressure side of an ammonia refrigeration cycle to provide the heat of evaporation. The water vapour from the boiling milk is condensed by means of the low pressure side of the refrigeration cycle, the temperature being about 70°F.

In another process known as "Freshprocess" evaporated milk, the whole milk is evaporated in the normal way, passed through a high-temperature short-time steriliser and then canned aseptically.[5] By this method the conventional sterilising in retorts after canning is obviated and the product, therefore, has less of the cooked flavour usually associated with evaporated milk. The unit has a capacity of 135 12½ oz. cans per min. and the whole process is claimed to require less time, space and fuel than the conventional method. Consumers are reported to be responding

favourably to this product which is claimed to have the appearance of fresh, homogenised milk and, after mixing with an equal volume of water, to taste like whole, fresh milk.

Evaporated milk must comply with recognised compositional standards which vary somewhat in different countries. Various formulæ are available to determine the amount of skim-milk or of cream to be added to any given batch. For the British Regulations of not less than 9% butterfat and 22% solids-not-fat, nomograms have been developed.[6] which simplify the appropriate calculations still further by permitting an entirely graphical solution. All calculations are based on the weight, and not volume, of milk, skim-milk or cream used.

**Canning and sterilising milk**

Much has been heard in the last year or two of the American process for canning sterilised or uperised milk aseptically—the Martin process—but few details have appeared in the dairy literature. An important modification of the original process has now been patented in the U.S.A. (*U.S. Pat.* 2,685,520). The equipment described is designed to fill sterilised milk into cans and to seal the cans in a sterile atmosphere of gases. The containers and covers are sterilised by superheated steam before they are filled with the cooled sterile milk in the filler section, which itself is steam sterilised before the run. In operation sterile conditions are maintained by a flow of sterile cooled gas. This is claimed to obviate an unusually high temperature rise during filling. Sealing is done in a sterile hot-gas atmosphere so as not to produce a high vacuum in the sealed cans after cooling, as would occur if steam was used.

Another interesting and entirely automatic plant for aseptic canning of sterile chocolate-flavoured milk drinks is reported from the U.S.A.[7] There are no fewer than 46 control devices and the whole process runs automatically on pushing the "start" button. A green light indicates when everything is aligned and ready, and a second push-button starts the flow of the product. Red lights indicate faults or temperature drops at any point and the whole system stops if the defect is not rectified within 30 sec.

Normally the sterilisation of milk in cans is done by water and steam, but a novel Swedish method uses hot air.[8] The milk is preheated to 162°F., filled into the cans (11 oz. and 14 oz.), the cans are sealed and washed in water at 176°F. They then pass to the top of the sterilising chamber, where the air is at 293°F., and pass in a zig-zag fashion for 15 min. On emerging the cans are at 253°F. and pass through a cooling chamber where they are sprayed with cold water. From this they emerge at 86°F. The plant has a capacity of 3,200 cans per hr. and produces a product claimed to be odourless, free of cooked flavour, to possess a texture of thin cream and to be absolutely sterile.

**Milk powder in the baking industry**

The world production of skim-milk powder has risen phenomenally since 1938, being in 1955 over four times the pre-war figure in the U.S.A. alone. Part of this is used in the liquid state, part is condensed, part is dried and a great deal is wasted due to absence of an assured market at home or abroad. One important user of skim-milk powder is the baking industry, which uses as much as 100,000 tons annually in the U.S.A. "Milk" bread is far less popular in Britain than in the U.S.A. and some other countries. The present position of skim-milk for the baking industry has recently been reviewed[9] but not all readers will necessarily agree that skim-milk powder is not likely to find in the bread industry the same popularity and extensive use it enjoys in the flour confectionery trade.

**Instant milk**

The production of a rapidly soluble or "instant" milk powder in the U.S.A. has been one of the most important developments for many years in the milk powder industry. There has always been a demand for a milk powder which would dissolve rapidly in water with a minimum of stirring or shaking. Such powders might prove a serious competitor to liquid milk in the home but would be useful for emergencies or where deliveries of liquid milk were interrupted or curtailed. Three brands of instant milk from the U.S.A. were recently examined in the Dairy Research Section Laboratory of the C.S.I.R.O. in Australia.[10] Only one brand was found to substantiate the claims made, although all samples dispersed more readily than the normal spray-dried milk powder. Unfortunately all the powders had a rather obvious cooked or processed flavour. Examination of the particles showed they were aggregates of more or less spherical primary particles and they contained a number of air bubbles. It appears that the powder received a two-stage drying process, the spray-dried primary particles subsequently being subjected to a second drying process. Some time during the manufacture the lactose had obviously been allowed to crystallise. After storage only one of the three powders remained free-flowing, the other two having caked somewhat. It would appear, therefore, that only this one powder represents a real development in dried milk processing. There are still some difficulties to be overcome, *viz.*, increased bulk (due to lower density), cooked flavour and higher manufacturing costs over the ordinary brands of dried milk.

**Advances in cheesemaking**

The long time required to make Cheddar cheese from running the milk into the vat until the salted curd is hooped and placed in the cheese press has always been a problem in the cheese industry. Recently promising modifications have been introduced in Australia which cut down the time required by some hours. Last year this process was tried on a large scale in several Australian factories in different states so as to study the

process under local conditions.[11] The essential difference from the normal Cheddar process is the use of *Streptococcus durans* in the starter and the higher temperature and shorter time used in curing. In Queensland some unsatisfactory results were obtained but in another large factory fine cheeses were made which won several prizes at the Sydney Royal Show. In addition promising results were obtained with rindless *Pliofilm*-wrapped cheese made by this process.

In the U.S.A.[12] the process has been used with success on a commercial scale with pasteurised milk, the cheese comparing favourably in quality with that made by the normal method from similar milk. Both high- and low-temperature curing yielded satisfactory results but cheese made from raw milk resulted in openness because of Swiss eye formation, especially in cheese ripened at 60°-65°F.

Of particular interest to the cheesemaker at the London Dairy Show was the new Desco curd cooling and salting machine, which automatically salts, mixes and cools cheese curd in any desired quantity. The cooler works on a conveyor belt principle by which chipped curd from an adjacent mill receives the precise amount of salt from a vibrating salting device, the salt being evenly spread over the surface of the curd. A discharge chute at one end conveys the treated curd away from the belt to suitable mould-packing facilities. The machine is designed to handle up to 1,000 lb. of curd when fully loaded but other units of larger or smaller capacity can be supplied.

**"Desco" curd cooling and salting machine.**

**Lighting effects on dairy products**

Fluorescent lighting is being installed to an ever-increasing extent in dairies and retail stores all over the world. Yet certain types may have adverse effects on the quality of dairy products, a fact which could become serious if the dangers are not realised until after the damage is done.

In Austria, where the blue-violet end of the spectrum was considered to be responsible for deterioration of butter, yellow light filters were fitted to the fluorescent electric light tubes by wrapping yellow paper round them, by painting the tubes with yellow lacquer or by using yellow glass in the manufacture of the tubes.[13] Samples of butter exposed to these sources of light all suffered some decline in quality compared with un-illuminated controls, the least decline being with the yellow glass tubes. It is suggested that these tubes and yellow window glass should be used in butter factories.

Swedish workers[14] found that all forms of fluorescent and filament lighting adversely affected parchment-wrapped butter on shelves or in cold cabinets in retail shops. Aluminium foil, however, proved an effective wrapper to protect butter against light.

In the U.S.A. similar results were obtained in studies with homogenised and non-homogenised, pasteurised milk.[15] It is concluded that cold stores and display cabinets for liquid milk should not be brightly illuminated and that filament lighting was preferred to fluorescent tubes in order to minimise ascorbic acid losses and increases in the peroxide value of the butterfat.

**Books on dairying**

Few books of importance have been published in recent years on the subject of dairy science and technology but a notable exception is "The Dictionary of Dairying" by Dr. J. G. Davis. Originally published in 1950 with 766 pages of text and 36 specialist authors, the revised edition in 1955 contained 1,132 pages and 57 specially contributed articles. (Publishers: Leonard Hill, Limited, 9, Eden Street, London, N.W.1. 65s. net.) The title of the work may mislead many into thinking that all the references in it are too brief for general reading, but this is not true since some of the sections have a large number of drawings and photographs which illustrate the text very well.

In an entirely different category is a monograph by Dr. N. King entitled "The Milk Fat Globule Membrane." This technical book surveys the complex theories of the structure and behaviour of the membrane round the butterfat globule. It is of importance not only in churning butter but in foaming of milk and cream, whipping cream, reconstituting dried milk, and in the stability of the fat in canned milk.

Milk is an almost ideal medium for the growth of bacteria and dairy bacteriology has always been one of the most important sections of dairy science and technology. A welcome addition, therefore, to books on dairying is C. H. Chalmers' "Bacteria in Relation to the Milk Supply." The last edition was in 1945, so the revised edition is much enlarged and contains new and up-to-date material on detergents, chemical sterilisers, pasteurisation, and sterilisation, as well as the usual chapters on bacteriology.

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# Nutrition and Dietetics

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**In recent years those concerned with nutrition and dietetics have become increasingly aware of the importance of correlating the results of experiments on animals (and on man) with the underlying biochemical processes in the cells and tissues. Slow but steady progress is being made in establishing the biochemical bases of nutrition. Current general nutritional investigations are characterised by an increased interest in energy requirements and expenditure, in problems of Africa and Asia and other under-developed areas; in the food requirements of ageing populations, especially in relation to disease; and in food additives.**

## Biochemical bases of nutrition

THE 1955 volumes of the Annual Review of Biochemistry and the Annual Review of Physiology, indicate the vast fields being covered by current investigations and they reveal also how facts are gradually emerging which assist in providing a biochemical basis for the science of nutrition. At the same time recent investigations have shown that many of the cellular processes, which at one time were explained in comparatively simple terms, are brought about by extremely complex cycles or chains of reactions, which taken together produce the gross effects found in nutritional experiments on the whole animal.

Information has become available regarding important inter-relationships between various nutrients and it is no longer possible to consider any one food component in isolation (see "Chemical Pathways of Metabolism").[1] Inter-relationships such as those between carbohydrate and fat metabolism and between calcium, phosphorus and vitamin D, have, of course, long been recognised, but many more examples can now be listed, of which only a few can be mentioned by way of illustration.

## Vitamins

The special number of the *British Medical Bulletin*, dedicated to the late Sir Edward Mellanby, and devoted to "Research on Vitamins,"[2] contains much valuable information on the rôle of vitamins in living organisms and shows how the concept of vitamins as catalysts in cellular processes has gained ground. It is now established that many, if not all, enzymes consist of two parts; one (the apo-enzyme) a protein component which confers specificity; the other (the co-enzyme or prosthetic group) which is actively concerned with the chemical reactions. Dalgliesh[3] has outlined the experiments carried out in many laboratories which have established the function of several of the B vitamins as co-enzymes, and which have demonstrated that the gross disorders characteristic of deficiencies in one of these vitamins may be correlated in many cases with a lack of the vitamins in a particular tissue and the consequent inhibition of some key enzyme reaction.

## Vitamins and amino-acids

Important work has been carried out on the inter-relationships of vitamins and amino-acids. Thus Dalgliesh[4] has studied the inter-conversion of nicotinic acid (a member of the vitamin B complex) and the essential amino-acid tryptophane, first demonstrated in 1945 by Elvehjem and his colleagues in Wisconsin. Investigations on the metabolism of tryptophane and nicotinic acid are proceeding in many laboratories.

A relationship (first indicated by H. M. Evans) between the sulphur-containing amino-acid methionine and pantothenic acid has been further examined by Dinning *et al.*[5] who showed that high protein diets had a sparing effect on pantothenic acid, and that this was related to the methionine content.

Inter-relationships have also been established between the amino-acids themselves and Harper *et al.*[6] have shown that a high level of leucine in the diet may retard growth, but that supplements of *iso*-leucine may prevent this effect. It is suggested that leucine is acting as an *iso*-leucine antagonist.

Experiments of this type have led in recent years to a reappraisal of the nutritional rôle of amino-acids as may be seen from Allinson's[7] review on the "Biological Evaluation of Proteins." The general complexity of the problem is illustrated by the symposium on "Nutritional Aspects of Blood Formation"[8] and by Fisher[9] in his monograph on protein metabolism.

## Lipotropic factors

Perhaps the best-known and the most intensively studied series of inter-relationships are those involved in the control of fat deposition in the liver. Best and his colleagues (who have been concerned with this problem for over 20 years) have recently[10] surveyed the present position and have indicated the advances made since 1935, when the term "lipotropic factor" was first introduced to describe the action of choline (the

nitrogenous base of lecithin) in preventing "fatty livers." It was demonstrated that compounds such as betaine (which is related chemically to choline) have a lipotropic action and that proteins have a similar action which is largely due to their methionine content. This was a prelude to the recognition (by du Vignaud) of a new type of biochemical process—"transmethylation"—involving the transfer of "biologically active" methyl groups.

Apart from its lipotropic action, choline is known to have other functions (*e.g.* as a growth factor) which have justified its inclusion in the list of dietary essentials (as a member of the vitamin B complex), but as Best and his colleagues[10] point out, vitamin $B_{12}$, folic acid, antibiotics, and also inositol, can under various conditions protect rats against the development of fatty livers, and moreover, several other dietary essentials, such as vitamin A, thiamine, biotin, and also, calcium can effect food intake and growth, and can alter the requirements of the animal for choline and methionine.

**Fats and related compounds**

The second volume of Deuel's comprehensive work[11] on Lipids contains much information of importance regarding fat metabolism and provides a background to current investigations on the nutritional rôle of unsaturated acids, such as linoleic and linolenic, which are classed as "essential fatty acids." Aaes-Jorgensen and his colleagues[12] have continued their studies of the effect of linoleic acid supplements on the growth rate of rats, fed on a basic diet of hydrogenated vegetable fats and have shown that this acid is more effective than skimmed milk and casein supplements. Deuel and his co-workers [13] have demonstrated that linolenic acid is less effective than linoleic acid, but that when these two acids are fed together, the potency of linolenic is equal to, if not greater than the other. This synergistic effect is now being further examined.

**Sugars**

The physiological effects of lactose has been the subject of a full review by Duncan[14] who has pointed out that a hydrolysis lactose gives the "energy producing" sugar glucose, and the "structural" sugar galactose, a component of cerebrosides and related compounds (important in the development of the brain and nervous system generally), and also the muco-polysaccharides. He has indicated also the potential rôle of the lactose molecule as a whole in helping to maintain the natural intestinal flora, and its general dietary importance in improving the utilisation of calcium and in increasing the mineral content of the bones.

From the above and other biochemical work reported in recent years we can see a pattern emerging in which feeding experiments of the traditional type are being interpreted in the light of tissue processes, and in particular reactions which link together fats, sugars, amino-acids, vitamins and minerals. And the more complicated the inter-relationships, the more it becomes apparent that the older concept of fixed minimal amounts of each dietary essential is of doubtful validity, as it would seem that in many cases the amount of a particular dietary factor required by the tissue may vary greatly depending on the other constituents of the diet.

The far-seeing worker in nutrition and dietetics has always been ready to recognise that, as many roads lead to Rome, so many different types of diets could produce sound nutrition; this idea is receiving support from current fundamental investigations.

**Energy requirements**

Investigations of energy requirements and expenditure laid the foundations of the science of nutrition, and after a relatively long interval there has been a revival of interest in these topics arising from their importance in relation to industry and to the Services, and aided by new and more compact types of apparatus which have enabled accurate observations to be made with minimum interference with the normal activities of the subject.

In the United Kingdom, important work is being carried out by Edholme in the Division of Human Physiology of the Medical Research Council, and by Passmore at the University of Edinburgh. Passmore and Durnin[15] have provided an up-to-date review of human energy expenditure, while Edholme and Fletcher, with Widdowson and McCance[16] have published the results of their investigations on army cadets. They have shown in a series of experiments, each extending over two weeks, that the energy expenditure, and also the food intake of the individual subjects, varied within wide limits and that while there was no correlation between the individual intake and expenditure on any one day, some correlation existed between the expenditure on some one day, and the food intake two days later. Figures were obtained for the energy expenditure on different tasks, such as sitting, standing, moderate and severe exercise, and the paper as a whole gives a most useful account of the methods of investigation and the techniques in this field.

**Under-developed areas**

An ever-growing number of publications are concerned with nutritional problems of "under-developed areas," this being not only a reflection of the research activities in Africa and elsewhere sponsored by Colonial Research Groups from the United Kingdom, France and Belgium, but also an indication of the many research centres concerned with nutrition, established in India and other parts of Asia, in Africa, in the Middle East and in South America. The reports of the Food and Agricultural Organisation and also of the World Health Organisation bear witness to newer interests in the international field and the symposium on the work of F.A.O. held in Oxford in 1955 under the auspices of the (British) Nutrition Society,[17] shows the range of the problems being in-

vestigated and reveals also a record of achievement.[18]

This overseas nutritional research has followed four main lines, (i) energy requirements, (ii) the nutritional value of indigenous foods, (iii) surveys of nutritional status, (iv) the study of deficiency diseases.

It is well known that the calory intakes in tropical and semi-tropical countries are often far below the standard normally recommended in Western Europe, and work is being carried out to see how far racial and climatic factors—and in particular temperature—modify the daily requirements. Schwartz and Dean[19] in their report on Uganda have commented on the low calory intakes, without obvious clinical signs of under-nutrition, in the groups studied. They have pointed out that also the growth and weight curves for children may be below those of British school children, but that this in itself is not evidence of malnutrition.

Research on indigenous foods has arisen from the recognition that in many areas of the world the food patterns differ considerably from those in Western Europe and North America. Therefore, efforts are being made to obtain factual information on both the major and minor foods being consumed. A series of papers has been published from the Central Food Technological Research Institute, Mysore, on Indian diets and on alternative sources of additional protein and protective foods.[20] Subrahmanyan and his colleagues,[21] in their report on rice substitutes, have stated the problem as the utilisation of "the coarse and low-grade food materials which are still abundant, and their conversion into first-grade articles of food," and they show how a rice substitute, based on tapioca and ground-nut flours has been successfully prepared. Similar work has been going on in Japan and it is stated[21] that the production in 1952-53 was 100,000 tons. This figure indicates how intensive laboratory research can form the basis of new industries and how food processing techniques developed in Europe and the United States can be modified and used for the benefit of peoples of other Continents.

Work in the Near East has been reported by Adolph[22] of the American University of Beirut, who has drawn attention to the widespread use of whole cereal grains as a characteristic pattern of the area. He has urged that whatever adjustments are made in the economy of the region it is important from the nutritional point of view that the use of whole cereals should not be abandoned.

Much attention has been given to African dietaries by Platt[18] and other M.R.C. workers and the report by Dean[23] on "Plant Proteins in Child Feeding" gives an excellent literature review of the efforts that have been made to utilise plant proteins as substitutes for milk and other more traditional components of infant food.

The review by Brock[24] of the University of Cape Town provides useful information on the work being carried out among the various races in South Africa and discusses in some detail the problems of deficiency diseases on the African continent brought about by what may be described in the broad sense as "protein malnutrition," not necessarily due to protein or amino-acid deficiencies in themselves, but characteristic of starchy, low protein diets from which many essential factors may be absent or in short supply. Much attention has been given to the disease Kwashiorkor, which has been the subject of a monograph by Trowell *et al.*[25] and of a paper by Brock[26] given at the Third International Nutrition Congress at Amsterdam.

**Food storage and processing**

The deterioration of fats during storage and the effect of antioxidants constitutes an important line of investigation of nutritional importance, as may be seen from reports from the American Meat Institute Research Foundation,[27] and elsewhere. Japanese workers[28] and others have studied the formation of peroxides and polymerisation products in oils which were stored for varying periods, or in which deterioration was brought about by aeration,[29] and have examined the effects of these oils when incorporated in the diet of rats. Matsuo[28] believes that peroxides are primarily responsible for toxic effects, but Kaunitz[29] is of the opinion that polymerised products are mainly responsible.

The work on antioxidants[27] being carried out in many laboratories is largely concerned with the search for harmless antioxidants which would be effective throughout food processing procedures.

The nutritional value of bread and other cereal products continues to attract the attention of scientific workers here and abroad. The book by Horder, Dodds and Moran[30] gives a wealth of information on bread. Problems of fortification are discussed also by Amos[31] and by Kent-Jones.[32]

The Widdowson and McCance[33] report on the Nutritive Value of Bread (based on researches in Germany on under-nourished children) has been the subject of many reviews and comments.[34, 35, 36] In a foreword to the report the Medical Research Council says: "The conclusions drawn must be restricted to the conditions under which the scientific evidence was obtained, and cannot justifiably be applied to the needs of populations in very different states of nutrition and with widely varying dietary habits." The authors themselves are careful to emphasise the same points. It is unfortunate that not all who have commented on the report have paid attention to this warning. As the authors state, "Probably the most important finding concerns the high nutritive value of wheat in any of the forms customarily consumed by man." It may be added that the controversy which arises in relation to such matters as the vitamin and mineral values of flours of varying extraction rates, and in relation to food additives, frequently obscures the rôle of bread as an important staple food supplying not only

energy but also by no means unimportant quantities of protein.

The general topic of nutrition in relation to food technology has been discussed by a number of authors.[37, 38] Mapson's paper gives a careful appraisal of the effect of processing on the vitamin content of foods.

**Health and disease**

The Amsterdam Nutrition Congress devoted one session to a series of papers on over-eating and disease, and many papers have appeared on problems of obesity[24, 39] and its relationship to coronary heart disease.[40] Evidence is accumulating that the level of circulatory serum lipid and lipo-proteins is an important factor related to the genesis and progress of coronary atherosclerosis and special attention is being given to the cholesterol content of the serum. Investigations on these and related topics are being actively followed up in many countries.[24]

Pediatrics has long been an active field for the nutrition worker, but there is now considerable interest in the nutritional status of the adult, and many workers are examining the special problems of nutrition in old age. Typical of such investigations is that of Gillum and his colleagues[41] who have published a series of papers providing information on the nutritional status (and in particular on blood constituents) of a large group of men and women over the age of 50.

**Dietary surveys**

The Annual Report of the National Food Survey,[42] published during the past year, provides information on domestic food consumption and expenditure (for 1953). The Survey has now been in operation since 1940 and the current report shows how the dietary pattern of different groups in the United Kingdom has altered in the period when rationing was coming to an end, so that the diet has tended to revert to a pre-war pattern with an increased expenditure on such items as meat, eggs, butter, sugar and also tea. The importance of the Surveys in the teaching of Nutrition has been reviewed by Hollingsworth.[43]

A survey of a different type has been published by Chappell,[44] who reported long term studies of individuals, one extending over 61 weeks, followed by a further period and a second over 13 consecutive weeks. This paper indicates the variations that can occur in normal individuals from day to day and week to week, and shows that fairly high errors are to be expected in experiments lasting for short periods, but that the errors can be reduced using three different one-week samples within a year.

Problems of food additives[45] and progress in vitamin chemistry[46] have been discussed in other recent reports in the journal, and need not be examined further here. The new edition of "Vitamins in Theory and Practice"[47] provides an up-to-date account of the subject.

The importance of nutrition in the international sphere may be seen from two recent books,[48, 49] while the Carnegie publication[50] on family diets in pre-war Britain provides a record of pioneer work undertaken in 1937.

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# *Improving the Food of India's Millions*

## CURRENT RESEARCH ON FOOD TECHNOLOGY AND NUTRITION

By S. R. Srinivarsan, M.Sc., Ph.D.

**The urgent need to raise the living standards of the Indian people is the stimulus for a wide ranging programme of research on food technology and nutrition now being undertaken by the Central Food Technological Research Institute at Mysore and other Indian scientific organisations. Here is a summary of recent research embracing "synthetic" foods, dairy products, vitamins and enzymes.**

WHILE biochemical and nutritional researches have been conducted in India for quite a long time, research on food technology with special reference to the food industries is of comparatively recent origin. The Council of Scientific and Industrial Research, principally through the Central Food Technological Research Institute, Mysore, is responsible for active encouragement of food technology research in the country and assistance for the starting of food manufacturing and packaging industries. The Biochemical Research Committee, at a recent meeting, outlined research programmes for inclusion in India's second Five Year Plan, which would lead to the establishment of biochemical industries in the country. At present there is hardly any organised biochemical industry in India. The Nutrition Advisory Committee of the Indian Council of Medical Research recently finalised research programmes for inclusion in the Second Plan which would tackle such problems as protein malnutrition, the development of concentrated protein foods from locally available food resources, the prevention of specific nutritional diseases and the relation between trends in population growth and diet.

The setting up of a Food Packaging Division at the Central Food Technological Research Institute at Mysore has been recommended by the Food and Agricultural Organisation expert Mr. G. L. Riddell. The food packaging industry in India is still in its infancy and the possibilities of organising food packaging and initiating research in the field have been emphasised. The proposed packaging division would concentrate attention on cans, glass bottles and jars, jute and textile bags, fibre board drums, collapsible tubes, wrappers of paper, metal foil, plywood and plastics. It has been suggested that the first research programmes might be concerned with permeability and shelf-life, and the testing of packages and packaging materials.

### "Synthetic" foods

In a persistent endeavour to prepare "synthetic" foods, the technological and biochemical aspects of "synthetic rice," developed at the C.F.T.R.I. have been studied and described in detail.[1] A method for the production of round synthetic grains from blends of tapioca and groundnut has been perfected.[2] The storage quality of this grain substitute has been studied[3] and it has been shown that the moisture content of the grain plays an important part in influencing its storage behaviour. A process for the preparation of vermicelli from *jowar*, wheat and tapioca flowers in the proportion of 2:1:1 has been detailed[4] and the product was found to be superior to rice in nutritive value as revealed from institution feeding experiments. A synthetic food containing vital nutrients and suitable for mass production has been evolved as a result of the "Meals For Millions" campaign. It has been reported that autoclaving improves the nutritive value of Bengal gram, horse gram and field beans, though it had no effect in lentils, black gram and green gram.[5] The production of vegetable milk from groundnuts, together with its economics, has been worked out.[6] While it is possible to prepare a milk substitute from coconut, the curds made from it had an unacceptable flavour.[7] Conditions for the production of dehydrated vegetable curd powder have been worked out and the product offers good scope for manufacture.

The chemical composition of Indian coffee varieties such as *Arabica* and *Robusta* has been studied. In particular methods have been developed for the detection of adulterants to Indian coffee such as date seed, tamarind seed, tapioca and coffee husk[8] as also the composition of coffee and chicory mixtures. The nature of coffee aroma and factors affecting it have been studied and an apparatus described for the determination of oxidation and volatile values of coffee and coffee substitutes.[9] The volatile values of coffee substitutes have been found to be significantly different from those of Indian coffee. Rapid qualitative tests for tannins and caffeine useful for routine sorting tests in the analysis of tea have been described.[10] Data on the analysis of some samples of ice cream and tentative standards for fat, lactose and milk solids-not-fat have been presented.[11] Pre-

liminary investigations on the preparation of fruit cereal products using fresh pulp have been reported.[12] Storage of food products and protection against insect attack have received some attention, while meat and fish processing have not attracted due attention. The results of research on fruit and vegetable preservation discussed at a symposium held in 1954 have already been reported in these columns.[13]

**Dairy products**

The results of experiments showed that the freezing point depression of milk was greater in the colostrum than in the normal milk of Indian cows and buffaloes; variations in freezing point were due to acidity, heat treatment, addition of starch, sucrose or reconstituted milk and other factors. Data regarding the freezing point, lactose and chloride contents and titrable acidity of goat and sheep milk samples have been presented.[14] It has been found that the percentage ratio of non-protein nitrogen to total nitrogen content of Sindhi cows fed on normal, high and low protein rations was 5·14, 7·06 and 4·70 respectively. The values for the total N.P.N., urea-N and amino-N in the milk increased when the level of protein in the diet was increased and *vice versa*.[15] The amino acid composition and nutritive value of milk and milk products have been studied. In a study of the effect of various factors on the vitamin A content of milk and milk products it has emerged that both fat-soluble and water-miscible forms of synthetic vitamin A added to milk for increasing its vitamin potency were stable to pasteurisation and boiling treatments.[16] That claims about the effect of tropical sunlight on the vitamin D content of Indian cows' butterfat were exaggerated has been shown by determinations by the lime-test technique in rats.[17]

In the biosynthesis of thiamine in the intestines of rats, sulphaguanidine has been found to suppress almost completely the biosynthesis while feeding of curds

**Solvent extraction unit used in the preparation of rice bran oil.**

or *para*-amino benzoic acid along with sulphaguanidine counteracts the inhibitory effect.[18] The application of the pre-stratification technique in the small as well as large scale production of *ghee* or clarified butter, and the packing and storage of *ghee* have been studied. Butter prepared from unprocessed milk developed 5-6% free fatty acid content in 6 days and showed decrease of 12·5-19·4% in vitamin A loss. When the butter was prepared from boiled milk, washed and stored in water or saline solution, the vitamin loss was greatly retarded. The oxidative rancidity and loss of vitamin A in *ghee* during storage were markedly influenced by light, temperature and atmospheric oxygen.[19] The vitamin A in *ghee* was not appreciably influenced by the type of container except that mud pots caused a considerable destruction of carotene and vitamin A in 3 months.[20] During frying and cooking of *ghee* 8 to 75% of vitamin A was lost. The first reaction during the oxidation process was the formation of peroxides and further decomposition of the hydroperoxides took place only at advanced stages of oxidation resulting in the formation of hydroxy compounds.[21] The use of thymolphthalein as a latent colouring agent for hydrogenated vegetable fats has been suggested.

**Vitamins**

A comparison of the stability of vitamin A acetate in crude and in refined groundnut oil as well as in blended and straight hardened oil showed that straight hardened oil retains the maximum amount of vitamin at 37 and 67°C. and refined oil the least.[22] Ethyl gallate did not afford significant protection in all the samples. The provitamin activity of a structural isomer of crypto-xanthin and its methyl ether was half of that of all trans-$\beta$-carotene in the rat. A new provitamin A, echinenone, isolated from the gonads of sea urchins, was half as active as all trans-$\beta$-carotene in the rat.[23]

The influence of different types of diets on the synthesis of thiamine in the intestines of the rat has been demonstrated. Rice and rice-fish diets had the least effects. The inhibitory effect of thiamine hydrochloride on the human chlorine esterase activity has been demonstrated; both thiamine and pantothenic acid deficiencies produce an appreciable decrease in the acetylchlorine content of the heart, brain and liver, the decrease being most in the liver.[24] Oral administration of penicillin caused marked growth stimulation, enhanced thiamine excretion and higher thiamine stores in rats. Folic acid or vitamin $B_{12}$ in higher concentrations was shown to afford adequate protection against the inhibition of aureomycin in the synthesis of both pentose and desoxy-pentose-nucleic acids in *Lacto-bacillus cæsi*.[25] Deficiency of either thiamine or riboflavin caused loss of vitamin $B_{12}$ in the liver of the rat. Profuse salivation and lacrymation, dilation of the pupil and respiratory failure were produced by intravenous injection of 1 or 1·5 mg. of dehydroascorbic acid per kg. of bodyweight in the rabbit. The initial shooting up of blood sugar level could be prevented by previous injection of dihydroergotamine methane sulphate.[26]

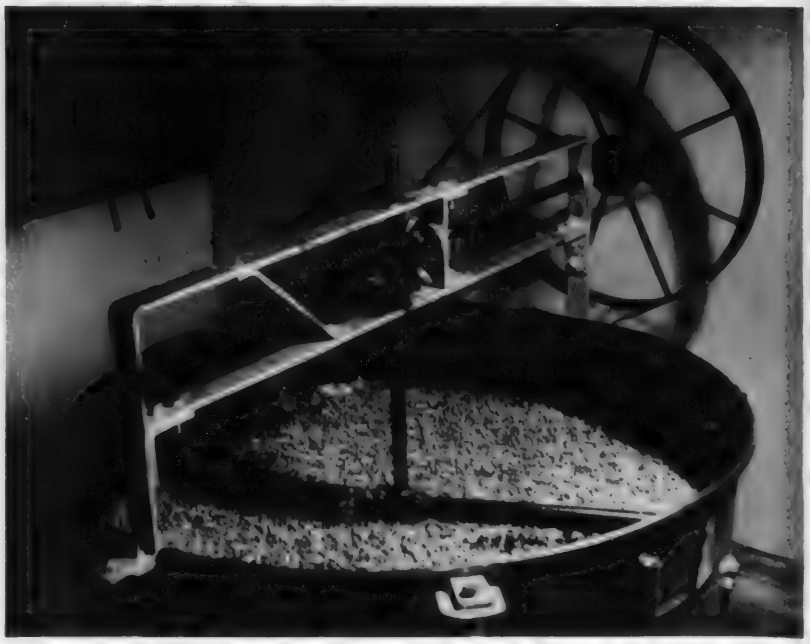
In a study of the effect of antibiotics on the oxidation of ascorbic acid it has been found that only Terramycin had a catalytic effect

on the oxidation of ascorbic acid to the dehydro state without liberation of carbon dioxide. The activity was specific for ascorbic acid at *p*H 8 and the reaction was not affected by sodium cyanide, glutathione, cystine and other substances.[27] The influence of vitamin C on the utilisation of sulphate labelled with $S^{35}$ in the synthesis of chondroitin sulphate of the costal cartilage of the guinea-pig was studied and the deficient animals, as compared to the normal ones were able to utilise only a third of the administered sulphate.[28] The growth-promoting properties of vegetables and animal fats as represented by maize oil and butter fat have been compared, with sucrose or lactose in the diet. It was found that when no vitamin E was present in the diet the blood vitamin E values of animals receiving lactose and maize oil fell nearly 60% in a week while it was not the case in the other group.[29] Biotin is able to overcome the inhibitory effects of chemicals in the riboflavin synthesis in *Aspergillus*.

The rôle of thiamine, biotin and folic acid in intermediate amino acid metabolism during germination of green gram and the effect of anti-vitamins as neopyrithiamine have been investigated.[30] Saffron has been found to be the richest known source of riboflavin.[31]

**Enzymes**

Considerable work has been reported on enzyme studies, and a new coenzyme for coupled phosphorylation reactions, particularly in the system which couples the breakdown of succinyl coenzyme A to the phosphorylation of adenosine diphosphate, is of significance. A trace contaminant in commercial ADP was isolated from yeast, purified by charcoal adsorption and chromatography, and shown to be guanosine-5′-pyrophosphate. The coenzyme was isolated and identified by $P^{32}$ activity.[32] A comparative study of the action of eleven antibacterial agents on the succinic oxidase system of the beef heart and pigeon breast muscle has been made. The inhibitory effect of all but one was countered by sulphydryl compounds.[33] The condensing enzyme from extracts of *Aspergillus niger* has been isolated.[34]



**Groundnuts being roasted preparatory to the production of groundnut milk.**

The oxidation metabolism of five well-defined antigenic strains of *Salmonella typhosa* has been studied and the hexoses found to be better utilised.[35] An attempt has been made to elucidate the mechanism of action of narcotics on the rat brain cortex by respiration studies. The increased sensitivity of the respiration of stimulated brain cortex to narcotics is due to the retarding effect of the narcotics on a specific phase of nerve inspiration that is potassium sensitive and is concerned with glucose or pyruvate oxidation.[36] In studies on hydrolytic digestive enzymes, the ratio of $\alpha$ to $\beta$ amylase produced by *B.-subtilis* has been found to be affected by brans, husks and oilcakes, with a medium containing wheat bran and lucerne yielding maximum enzyme production.[37] The presence of amylases has been reported in certain leafhoppers.[38]

Interesting work has been done on lipases, proteases and carbohydrases. The sulphatase fraction of ox liver has been separated chemically into two components which were shown by electrophoresis to be distinct from esterase and acid phosphatase; the intracellular distribution of the enzyme has been elucidated.[39-40] The enzymes involved in protein metabolism have been studied.

With $C^{14}$ labelled compounds used in the biosynthesis of asparagine, it has been shown that there is conversion of both glutamic acid and glucose into asparagine and that neopyrithiamine inhibits the conversion.[41] A new simplified method of estimating radioactive iodine in different fraction of hydrolysed thyroid has been described.[42] Valuable work resulting in improved chromatographic techniques has been persistently pursued. The value of subsidiary, substitute and little known foods in human nutrition has been assessed. Institution feeding experiments as a method of assessing the supplementary value of various types of food materials to poor vegetarian diets have been undertaken.

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(*Turn to page* 160)

# Advances in Food Technology

**OLIVE OIL**

***New Extractor***

In an endeavour to improve the efficiency of the mechanical processes of extracting olive oil, a French firm, Socam, has produced a new apparatus. It is a modern adaptation of a primitive physical extraction process used some fifty years ago but long since superseded by other methods. The new apparatus is the outcome of detailed research on the theoretical and practical aspects of olive oil extraction which showed that the highest mechanical extraction percentages can be attained by prolonged mixing of the pulp and judicious admixture of water at a suitable temperature. The new device combines the functions of washing, destoning, pulp crushing and oil extraction in a comparatively small machine inexpensive enough to be used economically even in minor establishments. The machine is claimed to have an extraction efficiency of the same order as that of conventional presses but yields oil of better quality at a lower cost, and with a higher degree of waste utilisation.—J. Demay, *Oléagineux*, 1956, **11**, 95.

**SAUSAGES**

***MSG in Frozen Pork Sausage***

Sausage was prepared in six ways. One group was an unseasoned control; one group was seasoned; two groups were not seasoned but contained 0·1% and 0·3% respectively of MSG (monosodium glutamate), and two groups were seasoned and also contained 0·1% and 0·3% respectively, of MSG. The sausage was frozen and then subjected to a taste panel each month after 2 months' storage, all sausage being seasoned and kneaded alike before being cooked.

The addition of MSG to seasoned sausage significantly increased the desirability of the sausage after 4 months' storage. Little difference was detected between the unseasoned control and the seasoned and unseasoned groups when MSG was added. The addition of 0·3% instead of 0·1% MSG was of no additional advantage.

Although there seemed to be some deterioration in quality, all groups treated with MSG were very acceptable after a year of storage, whereas the seasoned sausage without MSG was much less desirable even after 4 months of storage.—J. D. Kemp, *Food Tech.*, 1955, **7**, 340.

**FISHMEAL**

***Meal for Human Consumption***

A new French process of preparing fishmeal for human consumption is based on a practical and economic method of completely eliminating oils and fats so as to permit the preparation, from fresh fish, of fishmeal devoid of its typical odour and flavour and, therefore, more suitable for human consumption. The fat contents are removed in three stages by means of acetone and alcohol. Fish paste is first dehydrated with acetone. This is followed by heat treatment with ethyl alcohol and finally by dehydration and extraction of lipoid substances. The solvents (acetone and alcohol) are recovered through distillation and returned to the circuit. The fish oils and fats thus extracted can be utilised.—*La Revue de la Conserve*, 1955, **10**, 56.

**FISH OIL**

***Vitamin A Content***

The unsaponifiable fraction of fish oils contain vitamin A and some of its varieties. The origin of vitamin A in sea fish is still in doubt. Important hepatic reserves are formed by nearly all of them. Among the entrails, the pyloric cæcums are particularly rich in vitamins. In contrast, the vitamin contents of muscles and teguments are very small. In the circumstances, the body oils are comparatively poor in vitamin A. The richness of a liver oil varies not only with the zoological species but also with the physical condition, sex and geographical location of the fish. The extraction of the oil, which involves the splitting of the hepatic cells and the dissociation of a link between vitamin A and protein, is carried out by physical, mechanical, chemical or enzymatic processes. Extraction by solvents is also possible. As a general rule it is advisable to process the livers as soon as possible after the catch, though there are a number of preservation methods available.—P. V. Créaéh, *Oléagineux*, 1955, **10**, 801.

**MEAT PRODUCTS**

***Bacteriostatic Action of Curing Ingredient***

While sodium nitrite has been used for many years as a curing ingredient to produce the typical fixed red colour of cured meat, little precise information has been available on the contribution made by this curing ingredient to preservation of the product against bacterial spoilage. Research indicates that the most important substance limiting bacterial growth in cured meats is sodium chloride.

Permissible levels of sodium nitrite also inhibit the growth of a number of bacteria, depending upon such factors as air (oxygen), acidity (*p*H), and the presence of other chemicals that may be present during curing. Unfortunately, food poisoning staphylococci and a variety of lactic acid bacteria grow quite readily on cured meats containing any acceptable amount of curing salts.—A. G. Castellani and C. F. Niren, *Appl. Microbiol.*, 1955, **3** (3).

# To the Editor . . .

## Brisling, Sild and Sardines

SIR,—In the article on p. 78 of your February issue, under the heading "New Fish Cannery at Whitstable," you use the term brisling and sild sardines. This is incorrect as the description implies that brisling, sild and sardines are all of the same family, when, of course, they are three very different types of fish.

It is an offence under the labelling regulations of the United Kingdom for either brisling or sild to be described as sardines and, in fact, over 20 years ago a legal action was fought on this matter.

Although in some countries brisling and sild are sold as sardines, it is not the case in the United Kingdom, and as the largest importers of Portuguese sardines we are anxious that the general public should not confuse the three types of fish mentioned in your article.

S. E. GAIR,
*H. and T. Walker, Ltd.*
*London, E.C.3.*

## Standards for Sausages

SIR,—I was very interested in your leading article on sausages, in the March issue of FOOD MANUFACTURE, but I think you will find that the tendency for public analysts to appear against each other is disappearing. On the other hand, the more you press for standards the more power to your elbow, because I can assure you that the difficulty of public analysts in making decisions and deciding what to put on certificates is as great for them as for the manufacturer.

THOMAS MCLACHLAN,
*London, W.1.*

## Improving the Food of India's Millions

(*Continued from page 158*)


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## Powder Filtration of Beer

CLARIFYING beer by powder filtration saves 66% of labour compared with pulp filtration and also reduces the cost of the filter medium, according to Dr. Max Zimmermann (*Brewers Digest*, 1956, **31**, 1, 44). Shelf-life tests indicate that the stability of beer filtered through the powder filter is at least equal and probably superior to that obtained with pulp filtration.

The particular filter described by the author is a plate and frame unit with filter pads made of a fibre composition strong enough to make a break-through impossible. The filtering medium is diatomaceous earth. The filter has 30 frames and can accommodate 20 more if required.

The pre-coat, consisting of 40 lb. of an even mixture of coarse and very fine filter-aid and 1 lb. of asbestos powder, is mixed with water in a small tank and pumped into the slurry feed tank. With the filter full of water and about 10 additional barrels of water in a circulating tank, the circulation of the water through the filter is started and the slurry fed into it—very slowly for the first 10 min. and at the usual rate for a further 20 min.

The slurry tank is charged with the amount of powder required, using again an even mixture of coarse and very fine filter-aid. The beer is turned into the filter replacing the water, and circulated until the desired clarity is indicated by the photometer. Powder is fed into the filter at a rate of 0·1 lb. per barrel of beer and the filtration rate averages 130 barrels per hr. The pressure drop over the filter at the beginning of the filtration cycle is 2 lb. and rises gradually. At 40 lb. the filter must be opened, the pads washed off and a new pre-coat applied. At the end of the day, the pads are washed off and the filter is closed and flushed with water.

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A new technical catalogue published by J. H. Fenner and Co. Ltd., contains all the necessary data for chain drive design and enables the customers to design their own taper-lock chain drives to suit a particular application.

# Machinery and Equipment

## PACKAGING FREEZERS

New packaging freezers brought out by the York Corporation of New York are being built in two sizes. Both use ammonia refrigeration, the freezers consisting of a frame, refrigerated plates, control, refrigerant hoses, hoist, loader and the electrical controls.

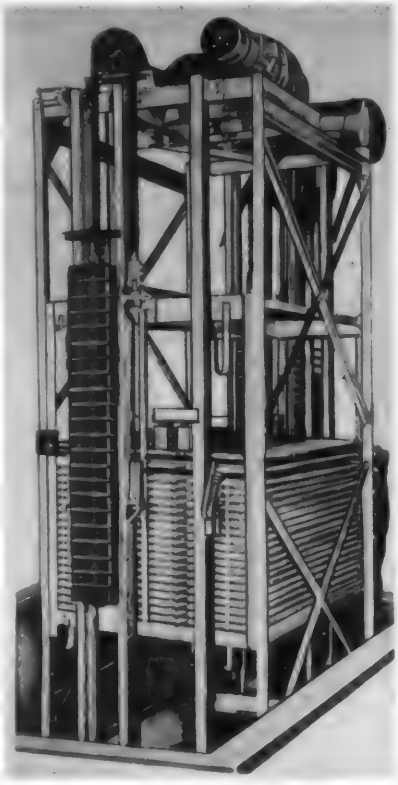
These freezers are entirely automatic and require only one worker for the loading, freezing and unloading process.

The advantages are low operating costs because of the automatic feeding and unloading. Operation is continuous, the product freezes on contact with the plate and loading can go on without interrupting the process.

Because the packages are in direct contact both at top and bottom, freezing is very rapid.

This is how the freezer works. Packages are conveyor-carried into the loading position. A push-button control automatically loads the freezer and pushes the packages on to the freezing plate. Succeeding rows of packages move into position automatically.

A mechanical counter indexes the freezer to the next loading station as the plate is filled. As the last station is filled an elevator is lowered to the bottom of the freezer. The operator must then reset the machine to the first loading position. As the loader pushes a new row of packages on to the plate, a frozen row drops off the back of the edge of the plate. They are chuted into a conveyor and taken to the storage chambers.



**Automatic package freezer**

## PROCESS INSTRUMENTS

Miniature instruments are capturing the attention of a rapidly widening industrial audience. The dimensions of these instruments are obviously important where graphic panels are required or where panel space must be economically employed. In addition to their useful size, some of the miniature instruments available today offer a brand new conception of process instrumentation.

"Off-the-shelf instrumentation" is one description applied to the *Tel-O-Set* range of miniature instruments available from Honeywell-Brown Ltd. *Tel-O-Set* instruments offer a standard pneumatic indicator, recorder, and controller for all process variables. Separate pneumatic transmitters for most variables are within the Honeywell range.

The instruments are unit constructed to permit simple replacement of major sections. But unit construction is only one aspect of the "unit" approach to modern instrumentation made possible by the introduction of these instruments. The design of future process instrumentation need only involve the selection of the required number of *Tel-O-Set* Units.

One of the most interesting and valuable features of the new instruments is the flexible operating relationship between recorder (or indicator) and controller. A flat gasketed surface at the rear of the recorder matches up perfectly with the controller which has a single lever quick-disconnect switch. The controller can be mounted in the back of the recorder, behind the instrument panel, or at a remote location. All controller adjustments are readily accessible from the rear.

Proportional and integral control actions of the *Tel-O-Set* controller are easily adjusted; the instrument offers a simple choice of three integral action times—slow, intermediate, and fast. Derivative control is readily added to the basic model.

The designers of these instruments carefully anticipated the requirements of operators and service engineers. A full 8-hr. chart record is visible when the chassis is withdrawn; with the chassis partially or completely withdrawn, the instrument remains fully operative. A horizontal scale above the chart provides a continuous indication of control air pressure to valve even when the recorder chassis is completely removed.

The location of control knobs ensures that manipulation (from front of panel) does not obscure the view of pointer or scale. Automatic chart reroll, giving 30 day process record and daily chart tear-off are available as alternatives.

Another example of flexible design is the interchangeability of the recorder and indicator chassis. The need for different-coloured instrument cases is eliminated by an interchangeable bezel on the front of the instrument.

The *Tel-O-Set* recorder requires a panel cut-out measuring only 5·1/32 in. × 4·9/16 in. This small area accommodates all that is usually visible of an instrument designed to meet the most exacting process requirements.

## SAUSAGE MACHINES

Two new bowl choppers and a sausage mincer have been introduced by a Danish company, A. S. Strommen. They are being sold to sausage manufacturers and meat processors in this country through the Alexandra Separator Co. Ltd.

The new bowl chopper, type 423.010, can work with both fat and meat without any previous mincing and with fresh or frozen products for all consistencies of meat. It has infinitely variable speeds to enable meat to be worked at the lowest possible temperature. Uniform production is controlled by a revolution counter on the bowl and a built-in thermometer. The operation of the machine is simplified by the use of a combined hand-operated star delta switch and pole changer giving two speeds on the knife shaft. This switch is mechanically connected to the lid-locking device. The bowl has a capacity of 200 lb.

A self-emptying bowl chopper is available in two sizes—200 litres which is equivalent to 500 lb. and 33 gal. which is approximately 300 lb. All working parts are "built-in" the machine to protect them from corrosion by water, salt, brine etc., and are

in an oil bath to reduce wear. The drive between the motor and knife shaft is V-belt driven and between the knife shaft and worm shaft is a chain drive immersed in an oil bath.

Automatic emptying is also a feature of the 44-gal. sausage mincer, designed for the large-scale production of minced meat. The emptying device consists of a rotating bowl which pushes the contents over the edge of the pan. It is claimed that this method of emptying has the advantage over other designs that the form of the bowl of the mincer remains unchanged and leakage through the bottom of the pan is avoided. The machine is completely enclosed so that washing water or meat fluid cannot penetrate into the inner working parts.

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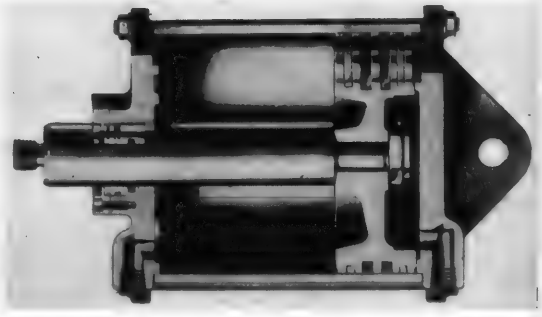
### PACKAGING PIONEERS

Fifty years have passed since the first automatic wrapping machine in Europe was built at the Neuhausen works of SIG, the Swiss Industrial Company. It was a wrapping machine for Neapolitans, built in 1906 to the order of a newly established enterprise in the French part of Switzerland, and was soon followed by machines for handling chocolate tablets. After the first world war SIG began to construct wrapping machines to their own designs, selling them through their own marketing organisation.

In 1947 it was again SIG who built the first chocolate wrapping machine in its present form, *i.e.* the type "C" with its driving components housed in a solid cast-iron base, and an output of 120 4-oz. chocolate tablets per min., or a daily production of 5 tons on a single machine. At the same time the first batches of the type DSH machine were supplied, the two stage design for protective wrapping whose output of 90 tablets per min. showed an increase of about 50% over existing models. In 1953 when the company marked its centenary, it introduced the type CK with a speed of 160 per min. The company claim that this is still unsurpassed by any competitive machine with the same programme.

The company soon turned their attention to the wrapping of other products and have gradually introduced machines for packing bon-bons, caramels, ice-cream, biscuits and crispbread. In 1934 machines for butter and margarine, and filling machines for free-flowing goods, besides a range of special constructions for a great variety of products, were introduced.

During the past 30 years SIG machines have been largely planned by Dipl. Ing. F. Reichenbach, who has been a director of the company for the past ten years. Under his direction large new factory buildings have been erected and prior to the second world war a further step was made from the manufacture of simple filling units to fully automatic packaging machines.



**Greatly reduced piston friction and less air leakage are said to be features of these modified air cylinders.**

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### AIR CYLINDERS

Foxboro-Yoxall's *Stabiload* air cylinders now incorporate a number of features which are claimed to result in greatly reduced piston friction and less compressed air leakage. Foxboro systems of pneumatic loading using the new cylinders, control roll pressures in stack and press type machines with greater accuracy. The new operating efficiency of the *Stabiload* air cylinders further increases the advantages to be obtained from pneumatic loading—ease and accuracy of load adjustment, quick change from load to unload, longer use of out of round rolls, uniformity of finish and increased production.

The principal modification is the adoption of a new method of piston packing known as the Block Vee seal packing. This is a continuous ring of synthetic rubber of a modified **V**-shaped cross section which is carried in annular grooves in the piston with the open end of the **V** facing the air pressure. The lips of the **V** are forced against the piston and the cylinder wall and form a seal with a regular area of contact, but not under solid compression.

The result is a tight, practically leakproof seal operating with the minimum friction. Two of these seals are used in the piston and one in the piston packing gland.

An important factor in the effectiveness of the Block Vee seal is the smoothness of the cylinder wall. This wall is now polished, honed, chromium plated and rehoned to a finish, controlled within 5 micro inches. Smooth, practically frictionless operation is helped by a thin film of oil from oil-saturated felt rings.

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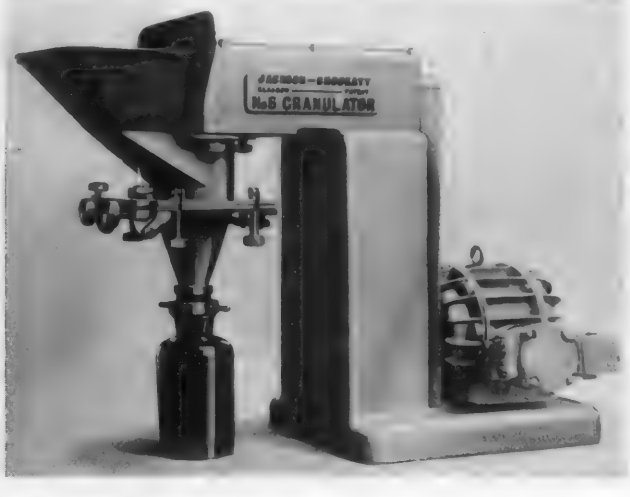
### GRANULATOR

A stainless steel reciprocating granulator No. 6 with the outlet provided with a screwed stainless steel flange to suit large bottles or jars is now being produced by J. G. Jackson and Crockatt Ltd.

The ½ h.p. electric motor is totally enclosed and is larger than normal. The mechanism of the machine operates in an oil-tight gear box so that lubrication is unnecessary, while running is silent.

All parts in contact with the material being treated can be quickly dismantled without the use of spanners and can be readily washed, sterilised and re-assembled.

The stainless steel wire cloth used in the machine has a long life as there is no flexing of the wires which are drawn tight and clamped between flanges.




**New reciprocating granulator, specially adapted to suit large bottles or jars.**

# News Digest

## Fanfare for the food fair

Publicity plans for the 1956 British Food Fair—which is to last six days longer than the last fair in 1954—are said to be the biggest ever for this occasion. Publicity ranges from classified advertisements to 48-sheet size posters, bulletin boards, transport displays and other special sites. Advertising for the fair will be handled by Mather and Crowther Ltd., together with the publicity given by the *Daily Express* who are sponsoring it.

This year the fair will run for 17 days, from August 28 to September 15. More than 88,000 sq. ft. of the gallery and ground floor of Olympia have been booked and exhibitors from twelve foreign countries, including the U.S. have booked space for the first time.

The fair is being organised by the Food Manufacturers' Federation through an exhibition committee headed by Mr. Frederick Monkhouse. Mr. J. F. B. O'Shea is the general organiser.

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## Technology of milk condensing

The Sugar Confectionery Panel of the British Food Manufacturing Industries Research Association met recently at the offices of the Cocoa, Chocolate and Confectionery Alliance Ltd. Dr. A. G. Lipscomb (John Mackintosh and Sons Ltd.) was in the chair.

After the report and discussion on research work in progress, members heard an address by Mr. G. B. Wright, director, The Northern Dairy Group, on "The Technology of Milk Condensing."

Technology in the industry, said Mr. Wright, had eliminated many of the former uncertainties in its processes. As a result, products of standard grade and quality had been achieved from a variable raw material.

The effects of heat on milk at various stages of concentration were of governing importance in milk condensing, but they were not completely understood.

Other points covered by Mr. Wright in a talk ranging over a wide field included advances in processing technique centred on the development of the vacuum evaporator. Problems in the cooling of sweetened milk and the control of lactose crystallisation were outlined.

The benefits resulting from the development of the continuous cooker and cooler in the production of sterilised evaporated milk were also dealt with.

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## Apple storage discussed

Attention was centred on the storage of Cox's Orange Pippin at the Members' Day at East Malling on Wednesday, February 29. Samples collected from nearly a hundred growers in various parts of the country and stored in a scrubbed gas store for almost five months were on view. Results for similar samples taken from cold store four weeks earlier were also displayed.

The director, Dr. F. R. Tubbs, in welcoming the members, expressed his appreciation of the help given by the Ministry in the erection of the scrubbed gas stores and warmly thanked the fruit growers and others who had helped in providing the fruit and in getting it to the research station.

After examining the fruit, and seeing the gas stores and a special exhibit of storage troubles arranged by Miss S. Morrissey, the members assembled in the staff canteen for a discussion of the results, opened by Dr. H. B. S. Montgomery. Among the interesting points raised was the beneficial effect of a grass sward on keeping quality, and the degree of control that can be achieved by captan sprays in August.

It was apparent that the maximum economic life of Cox's Orange was not nearly exhausted, even with existing cultural practices, provided *Gloeosporium* is controlled and adequate storage facilities available.

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## Changes of name

The Creamery Package Mfg. Co. Ltd., has changed its name to C. P. Equipment Ltd. to make its title more appropriate to its current activities, following the success of the continuous processing principle developed in recent years. Production is being transferred from Bristol to the Mitcham premises so that visitors can inspect more conveniently the range of C. P. products.

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The directors of Allied Bakeries Research Laboratories Ltd. announce that their company has changed its name to Weston Research Laboratories Ltd.

## Leonard Hill talks about America and the Americans

Since the war Mr. W. Leonard Hill, chairman of the Leonard Hill publishing group, has made several trips to the United States and has travelled many thousands of miles in that country, visiting industrial and research establishments from New York to Texas. He made his last trip just before Christmas; on March 5 the opportunity was taken by the company to arrange a reception at the Royal Society of Arts in London during which Mr. Hill summarised his most recent personal impressions of America and the Americans in a lively and entertaining talk. He was introduced to his audience of industrialists, scientists and businessmen by Mr. J. E. Currie, vice-president of the American Chamber of Commerce in London. Among those who accepted invitations were Admiral Charles Lyman, U.S. Naval Attaché in London, Dr. E. H. T. Hoblyn and Mr. J. L. Good (Food Machinery Association), Mr. G. R. A. Short and Mr. S. Nicholson (W. J. Bush and Co. Ltd.), Mr. L. Landon Goodman (Electrical Development Association), Dr. J. R. Booer (F. W. Berk and Co. Ltd.), Mr. A. W. Smith (Frederick Aldridge Ltd.), Mr. J. R. Poulton (John Benington Ltd.), Miss Sadie Gold (Greenlys Ltd.), Miss Sylvia Weinberg (Armstrong-Warden Ltd.), Mr. T. H. G. Burden (Masius and Fergusson Ltd.), Mr. R. Palmer (Pritchard, Wood and Partners Ltd.), Mr. W. Wooller and Mr. R. Holmwood (Ripley, Preston and Co. Ltd.), Mr. J. H. Barnett (G. S. Royds Ltd.), and Mr. Hilbert Hardy (Townend, Smith and Hardy Ltd.).

Mr. Hill summarised his impressions thus: "Americans have more spiritual life (than the British), whereas in business they are more effective and materialistic. They have few false loyalties. They rejoice and gain strength in their freedom from hereditary privilege, and they are fair dealers."

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## Minimum salaries for chemists

The latest edition of the British Association of Chemists' "Recommended scale of minimum salaries for chemists and chemical assistants" has recently been published. The salaries range from 75s. per week for a Grade III junior assistant aged 16 to £2,000 a year upwards for senior chemists.

### New ice-cream depot

A new ice-cream supply depot to service the Southampton district has been opened by T. Wall and Sons Ltd., in Millbrook Road, Southampton. This 4,000-sq. ft. depot replaces an older one which now becomes part of the firm's adjacent Southampton H.Q.

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### New preserves factory

A new factory is being built on a 20-acre site near Aylesbury by Wm. Moorhouse and Sons Ltd., manufacturers of lemon cheese, lemon curd, jams, marmalades, jellies, purées, piping jellies, bottled fruits, Christmas puddings and mincemeat. It is expected that the factory will be in full production in time for the coming fruit season.

The modern plant to be installed will include a bulk sugar plant and oil-fired boilers cutting out all smoke so as not to interfere with the local amenities.

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### Welfare block for Wall's workers

Work has begun on a £260,000 welfare block to provide canteen and other facilities for the ice-cream and meat-products' factories of T. Wall and Sons Ltd., at Godley, near Hyde (Cheshire). It is estimated that the new four-storey block will be completed in about 12 months' time.

The health section is expected to be one of the most up-to-date in the country, comprising a chest X-ray unit, a surgery, a room for optical and sun-ray treatment, rest rooms and facilities for chiropody.

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### Dairy scientists visit APV laboratories

A party of 25 from the National Institute for Research in Dairying visited the new APV laboratories at Crawley recently. The party was led by Prof. H. D. Kay. The visitors were welcomed by Dr. Richard Seligman.

After a tour of the foundries and works during the morning the afternoon was entirely devoted to a tour of the recently completed research building which houses the research and development department of APV. The research block was built at a cost of £67,000 and occupies 21,450 sq. ft. of floor space. Adjoining it is the new still house with an available overall height of 63 ft. The staff of the department number some 80-90 persons under the supervision of Mr. G. A. Dummett. Between £50,000-£100,000 is spent on the work of the department each year.

## ERECTIONS AND EXTENSIONS

Early erection of extensions to their factory in South Lambeth Road, London, S.W.8, is planned by **British Vinegars, Ltd.**

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**National Canning Co., Ltd.,** have plans prepared for the erection of a new cold store and office building at Godstone Road, Whyteleaf, Surrey.

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**M.B.T. Frozen Foods, Ltd.,** are planning a new storage and distribution centre at Cocker Street, Blackpool, Lancs.

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**British Cellophane, Ltd.,** have received planning approval to develop a 101-acre site at Sowerby Woods, Barrow-in-Furness, for the erection of new factory premises.

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**Hygrade Corrugated Cases, Ltd.,** carton manufacturers, are seeking permission for an extension to their factory at Southall Trading Estate, off Boston Road, Hanwell, London, W.7.

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**Loders and Nucoline, Ltd.,** edible oil refiners, have plans in hand for the erection of a warehouse at Cairn Mills, Silvertown, London, E.16.

**Austin and Co. (Containers), Ltd.,** box manufacturers, have had plans prepared for the erection of extensions to their factory in Hagden Lane, Watford, Herts.

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**M. Petrushkin, Ltd.,** cardboard box makers, are planning factory extensions in Sugar House Lane, London, E.15, estimated to involve an expenditure in the region of £60,000.

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**Rayner and Co., Ltd.,** essence distillers, are planning new extensions to their factory, plus a storage building, at Commercial Road, Edmonton, London, N.18.

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**H. J. Heinz and Co., Ltd.,** are having plans prepared for the erection of a warehouse and new branch offices in Sealand Road, Chester.

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**Bovril, Ltd.,** are seeking to acquire a site in Govan Road, Glasgow, for the proposed erection of a new storage building and office block.

### Packaging conference

A National Packaging Conference will be held at Brighton from April 12 to 14 under the auspices of the Institute of Packaging. Its theme will be "Progress in Packaging." There will be two sections, one dealing with consumer and the other with non-consumer goods.

The main session of the conference will be opened by the Institute's president, Mr. J. E. Evan Cook on Friday, April 13.

Members and non-members of the Institute of Packaging will be welcomed. Full details can be obtained from the Institute at 20, Took's Court, London, E.C.4.

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### York Shipley conference

Mr. Ted Leather, M.P. addressed the York Shipley sales conference recently on the subject of export credits and credit insurance. Other speakers included Mr. H. G. Rowe of Imperial Chemical Industries Ltd., who spoke on corrosion problems in soft-water areas and Mr. P. D. Galvani of Premier Supermarkets Ltd., who spoke on self-service.

### Packaging tape centre

The opening of John Gosheron and Co.'s new premises at the Packaging Tape Centre, Vauxhall Bridge, marks the beginning of a new stage in the company's history said Mr. M. R. L. Robinson, a director of the company, at a reception given at the centre recently. This development brings together under one roof the entire range of Gosheron industrial tapes.

The company was founded in 1909 by Mr. John Gosheron, a promising young sportsman and a contemporary of Sir Jack Hobbs. The company prospered until the outbreak of the first World War when Mr. Gosheron, together with most of his staff, joined the Colours. On his return in 1918, the company regained its pre-war momentum and prospered until 1940 when the premises were bombed and some of the staff killed. Since every one of his 50,000 records was lost, Mr. Gosheron literally started afresh. Today the company has a staff of about 150 men and women throughout the British Isles and a fleet of distinctive vans.

The five sons of Mr. Gosheron are learning the business in various capacities within the company.

### Metal Box expansion

A new factory covering 205,000 sq. ft. is to be built for the Metal Box Co. at Rochester. It will cost approximately £700,000.

Metal Box are also building a factory at Botcherby, Carlisle at a cost of £450,000 and another at Westhoughton costing £700,000. They are also completing an extension to their factory at Speke which will cost £327,000. A new head office which Metal Box hope to occupy by the end of the year is being built in Baker Street, London.

Almost all the equipment for the factories will be provided from the company's own resources. When completed they will employ some 1,000 additional workers and increase the company's can making capacity by 920 million.

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### Bigger resources for container development

Integration of H. G. Sanders and Son Ltd., and Saturn Industrial Gases has now been completed under the direction of Mr. T. O. M. Pope, managing director of the Saturn group.

The technical and administrative divisions of Saturn Industrial Gases, who acquired the Sanders company last year, are now established at the Sanders factory at Southall—now renamed Saturn Works. H. G. Sanders now have greatly increased research and development resources for the production of collapsible metal tubes and rigid containers.

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### Ventilation service exhibited

Their free consultative service to industrialists with factory ventilation problems will be featured by Colt Ventilation Ltd., at the Factory Equipment Exhibition to be held at Earls Court, London from April 9-14.

Their stand will show how the Colt consultant goes into a factory to make a thorough survey, some of the instruments he uses to do this, how the analysis of the survey is prepared in the technical department, and finally written up in layman's language so that the client is able to understand his problem, the ventilation recommended, how much it will cost, and what improvements may be expected from it.

Another display on this stand will show how the *Colt* "Two-Way" window fan fulfils its simultaneous and two-fold function of being an extract and an intake unit at one and the same time, so that the stale air removed from a room is exactly counterbalanced by clean, filtered fresh air replacement without draught.

### OBITER DICTA

● If Stilton is the aristocrat of English cheeses, then Cheshire is a country gentleman at least. —*Cyril Ray in Sunday Times.*

● I just cannot cook pastry. Either I burn it or else it is a soggy, underdone mess.—*Prince Alfonso of Hohenlohe-Langenburg.*

● The bride and groom came out of church—and walked smiling, under an archway of raised beer bottles. Said the vicar: "I was furious."—*Daily Express.*

● Soprano Maria Callas complained in court that her prestige had suffered because her name was used in an advertisement for "slimming spaghetti."—*Evening Standard.*

● Owing to some recording difficulty all the players make the mangled verse sound as if it were being spouted by babies through mouthfuls of breakfast food.—*Film critic, Financial Times.*

● It is a pity that the reference books insist upon the statement that potatoes average 75-80% water—it makes the prices in the greengrocer's seem so much higher.—*Travers Circular.*

● Chickens have a better time in Russia. I found some having a holiday on a collective farm because their output was 50 to 60 eggs per bird per annum. —*Parliamentary Secretary, Ministry of Agriculture.*

● Beef, mutton, pork is a narrow range. Surely some enterprising company or country should find it worth while to popularise antelope or bear.—*Sir George Thomson,* F.R.S., *in "The Foreseeable Future."*

● Billy Stomachache—the Marquess of Ailesbury—had special pockets made in his peer's robes to contain bags of flour for throwing at the Lord Chancellor.—*Guy Deghy and Keith Waterhouse in "Café Royal."*

● When I was young in Vienna, I was told that girls only admired bald men with a "solid" figure. Now you have to be slender with a fine crop of hair. It is much less trouble to find your pleasures in rich fried food and a bottle of red wine.—*A. J. P. Taylor.*

### News for importers

Arrangements for the import of fresh citrus fruit from the U.S.A. were announced by the Board of Trade in Notice to Importers No. 727 in April last year. Arrangements have now been made for further imports of fresh oranges, lemons and grapefruit from the U.S. to be purchased with dollars made available under the U.S. Mutual Security Act, 1954. Only one set of licences will be issued, but they may be used, within their total value, for all or any of the three fruits named above, subject to the following limits on the period of importing:

Oranges—up to October 31; Lemons—from April 1 to October 31; Grapefruit—from April 1 to September 30.

Details are given in Notice to Importers No. 775 issued by the Import Licensing Branch of the Board of Trade.

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### Tube foods demonstrated

The advantages of packing food in tubes were explained and demonstrated to representatives of the food industry at a reception held by the Collapsible Tube Manufacturers' Association.

Snacks and canapés were prepared by Mr. G. N. Carini of the May Fair Hotel from tubes to demonstrate the ease and speed with which this can be done. Later speakers described the services provided by the C.T.M.A. to food manufacturers. The commercial possibilities of tubed foods were discussed by Mr. P. Galvani, joint managing director of Premier Supermarkets.

Mr. G. E. Holmes, chairman of the chemists' committee, explained that the seven members of the C.T.M.A. co-operate in matters of research and development through the agency of sub-committees. He described the service given to existing and potential customers by his committee and surveyed the chemical aspects of packaging food in collapsible tubes.

Tube-filling and other problems were discussed by Mr. F. W. Rumball, the chairman of the technical committee, while the work of the advisory committee was described by its chairman, Mr. J. G. Wilson. "We have chemists, pharmacists, metallurgists, engineers and many other experts, all available to deal with customers' problems" he said.

Speaking of his customers' reactions to tube-packed foods, Mr. P. Galvani said that there is ample demand for various preparations at present only packed by Continental manufacturers, to be produced and sold in this country, such as cooking preparations, cake and sweet dressings, etc. Other foods that could be tubed over here are meat and fish pastes, meat extracts and fillings for sandwiches.

# COMPANY PROFITS AND PROSPECTS

### Unilever's preliminary figures

Combined trading profits throughout the world of Unilever Ltd., and Unilever N.V. are estimated at £85,556,000 (£70,095,000) and consolidated net profit at £45,180,000 (£31,854,000). The net profit includes the unusually large sum of £6,023,000 (£2,667,000) of exceptional items and profits relating to previous years.

The provisional results of Unilever for any year are known in the following February and consolidated in the middle of April or later. However, the board feel certain that there will not be any important differences between the preliminary and final figures and have decided in future to publish the provisional results as soon as they are available.

The board recommend for Unilever Ltd. a dividend of 9¾% making 15¾% for the year and for Unilever N.V., a dividend of 8¾% making 14% for the year.

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### Chocolate makers' losses

A group loss, before tax, of £30,955 was incurred last year by H. J. Packer and Co., chocolate and cocoa manufacturers, who previously made a profit of £429,966. The company is halving the Ordinary dividend at 10%.

The loss is attributed to the full impact of high raw material prices reached during the year, the loss of turnover due to the hot summer and intensified competition, and to higher production costs arising mainly from wage increases.

A group overall loss of £99,097 was incurred by Elizabeth Shaw (Holdings) for the 15 months ending December 31. To this must be added £481 net Preference dividend paid out of profits earned during the three months ended December 31.

The board has decided to recommend increasing the capital to allow the company to expand the group's operations. The period of reorganisation is reaching an end and in the opinion of the directors the loss will prove to be only a temporary set-back in the company's long-term development.

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### Oxo's good year

An increase of £227,000 to £2,704,783 in the group trading profits of Leibig's Extract of Meat Co. Ltd., was more than accounted for by the increased profits of Oxo which has had a very successful year, reported the chairman, Mr. Kenneth Carlisle at the company's annual meeting.

The substantially larger turnover was largely attributable to the return to private hands of the distribution of corned beef, enabling a more general absorption of costs. Overseas sales are still higher and the company hopes to obtain a greater share of the North American market with their new factory in Canada. This is being built on the outskirts of Toronto and is scheduled to commence operations in August.

Of the company's overseas factories, the profits of Tanganyika Packers Ltd., has sharply declined from the excellent results of last year and the profits of the Belgian company have also been less. The Italian company is still doing well. The small factory at Kano came into operation last year with the production of canned meat products in Nigeria and West Africa generally

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### Sweets profits fall

The trading profit of James Pascall, manufacturing confectioners, declined in 1955 from £474,899 to £364,831. However, the Ordinary dividend of 50% has been held.

Although the company's gross profits were 23% lower, with increased advertising they have managed to hold their own in increasingly competitive conditions.

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### Idris' highest output

Group profits of Idris Ltd., soft drink makers, rose from £95,309 to £117,829 in the year ending October 31, 1955. The company reached the highest output in its history during the fine weather last year.

A 50% holding in Coca Cola Bottlers (Scotland) has been acquired.

▪

### Canner can't afford big profits

His company would have been out of business by now if profits had not been reduced said Mr. Wallace Smedley, chairman of the National canning group of companies in a television broadcast recently.

Mr. Smedley, who was being interviewed on the I.T.V. "Seconds' Out" programme said: "If we had not spent several million pounds in buying more modern, up-to-date plant, our costs would have risen far more than in fact they have done and, as a result, we should have been out of business." Mr. Smedley continued "For two years my company made exactly the same amount of profit. But in the second year we produced 25% more goods. Which means to say that the actual profit per item sold was less."

### More sales, same profits

Although higher sales—primarily of canned goods—increased Foster Clark's turnover by 20% last year, the fall in profits of their Australian subsidiary affected the total profit of the group so that it was virtually unchanged at £30,463 (£30,449). The turnover of Foster Clark (Australia) Ltd. was almost maintained at the high record level of the previous year in spite of stronger competition, but higher costs caused the trading profit to fall to £17,674 compared with £30,902 in the previous year.

However, better things are expected of the Australian company next year, while the parent country is to augment their product range and improve their packs still further.

Although it was originally planned to move the macaroni manufacturing plant at present in Lancashire to Maidstone, the directors are considering a suggestion that it should be transferred to another paste goods manufacturing unit which would be responsible for making and packing all the company's paste goods requirements. Should the negotiations succeed the products will continue to be marketed under the trade name "A.P."

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### 20,000 tons of surplus sugar

Although the trading profit of the West Indies Sugar Co. Ltd., last year at £700,214, was £119,155 less than in the previous year, the net profit at £429,154 was slightly higher owing to a credit for tax adjustment. The chairman, Mr. Peter Runge, said that the lower trading profit was due to smaller sales (though production was up), lower prices and higher costs. The cost of planting bananas has also been high.

The company's sugar production from the 1955 crop amounted to 151,953 tons—four times as much as before the war. However, Jamaica's production is still in excess of her quota under the Commonwealth Sugar Agreement and the International Sugar Agreement and although up to 1954 it had been possible to export the surplus, this cannot be done now and consequently the company had been left with 20,000 tons of sugar which had to be stored until it could be shipped as 1956 quota.

This is an expensive business and deterioration may be substantial but under the International Sugar Agreement the company may not store surpluses in Britain. The problems of over-production have led the company to plant bananas as an alternative crop.

A final Ordinary dividend at the rate of 11d. per share making a total distribution of 1s. 3d. per share was recommended.

## Appointments and Retirements

LT.-COL. G. R. HARDING has been elected chairman of Aplin and Barrett Ltd.

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MR. COLIN S. DENCE has been appointed a member of the Food Standards Committee in place of MR. ROBERT WRIGHT. Mr. Dence is a past president of the Food Manufacturers' Federation and managing director of Brand and Co. Ltd.

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DR. F. H. BANFIELD, director of research, British Food Manufacturing Industries Research Association, has been appointed a member of the Committee of Management of the Low Temperature Research Station at Cambridge University.

The appointment, which is on the nomination of the Committee of the Privy Council for Scientific and Industrial Research, is until December 31, 1959. It follows the recently announced close participation of the B.F.M.I.R.A. in the Government's research programme at the station into the preservation of food through the use of ionising radiations. Two members of the association's staff have been seconded to the work.

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MR. THOMAS W. HOWARD has succeeded his cousin, the late Mr. Geoffrey E. Howard, as chairman of Howards and Sons Ltd., and Howards of Ilford Ltd. Mr. Thomas Howard, who is 41, was educated at Marlborough, Trinity Hall, Cambridge and Zürich. He joined Howards and Sons Ltd. in 1939 and was made a director in 1940. He has been managing director of Howards of Ilford Ltd. since 1953 when that company was formed. He is chairman of the Drug and Fine Chemical Group of the Association of Chemical and Allied Employers and a member of the London Regional Committee of the Association of British Chemical Manufacturers. He is a playing member of the M.C.C.

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MR. S. OSWALD CHIVERS, C.B.E., has been appointed chairman of the board of Chivers and Sons Ltd., following the death of Mr. William B. Chivers, with MR. J. STANLEY CHIVERS, as vice-chairman. Mr. Oswald Chivers and Mr. Stanley Chivers are brothers. They will act as joint managing directors of the company, the former being responsible primarily for manufacturing and merchandising operations at home and overseas, and the latter primarily for the company's farming interests.

MISS R. HOPE CHIVERS will continue as a director, and Mr. W. NOEL CHIVERS and MR. PETER C. CHIVERS (sons of the late Mr. W. B. Chivers), and MR. JOHN CHIVERS (son of Mr. J. S. Chivers), are appointed as additional directors.

Mr. Oswald Chivers has been a director of the company for 34 years, Mr. Stanley Chivers for 42 years and Miss Hope Chivers for 17 years.

**Dr. F. H. Banfield.**

**Mr. Thomas McLachlan.**

### Hinchley Medal award

Mr. Thomas McLachlan, the public analyst, has been awarded the Hinchley Medal of the British Association of Chemists. He received the medal on Friday, March 16, when he gave an address—"The Analyst—Chemist, Technician or Magician?" Mr. McLachlan is president of the Association of Public Analysts.

## Obituary

MR. W. B. CHIVERS, who had been chairman of Chivers and Sons Ltd. since 1929, died suddenly at his home in Cambridge, on Friday, February 17, aged 62. He was educated at Mill Hill School and Christ College, Cambridge. After serving in the first world war, he joined the family company becoming a director in 1919, and succeeding his father, Mr. John Chivers as chairman on the latter's death in 1929. He was also chairman of Chivers and Sons (Ireland) Ltd., Enderby and Co. Ltd., and Frank L. Benedict and Co. Ltd., of Canada, and was a director of the various companies associated with Chivers and Sons Ltd. At the time of his death he was president of the Royal Warrant Holders' Association. He had been a member of the executive council of the Food Manufacturers' Federation for many years, and was a vice president of the Institute of Certificated Grocers. He leaves a widow, two sons, and a daughter.

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### Dr. R. T. Colgate honoured

The Fellowship of the City and Guilds of London Institute has been conferred on Dr. R. T. Colgate, chief technical works manager and chief chemist of Huntley and Palmers Ltd., Reading, in recognition of his distinguished contributions to industry and the profession of engineering.

Dr. Colgate studied chemistry under Professor H. E. Armstrong from 1906-10 at the Central Technical College as the City and Guilds College was then called. From 1910 to 1912 he was a lecturer and assistant to Prof. Armstrong.

In 1913 he was appointed chief chemist to Huntley and Palmers, Ltd., and since 1945 has held the additional post of chief technical works manager. Dr. Colgate has been a very active member of the Society of Chemical Industry, having held several honorary offices since 1927. In 1946 he was appointed first chairman of council, British Baking Industries' Research Association (D.S.I.R.) and continues to hold that office. In 1948 he was a member of the Government-sponsored mission to the U.S.A. to report upon new regulations concerning purity of food products.

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### Bakery education

Formal annual general meetings of the old National Board for Bakery Education Ltd., and the National Joint Apprenticeship Council have been held. An extraordinary meeting of the directors of the new company has also taken place, at which resolutions were passed to dispense with the use of the word "Limited."

# Food News Overseas

### Dairy plant for India

A small-scale installation for a milk factory has been presented to the National Dairy Research Institute at Karnal, India by the Dutch Government, in appreciation of India's efforts at improving the dairy industry.

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### Canning plant on Russian trawler

A miniature canning plant, has been installed in the new Soviet Union Arctic trawler *Pioneer*, which was handed over by her British builders to a Russian crew at Lowestoft recently.

In the canning plant on these trawlers oil will be extracted from the livers of the fish before they are canned in tomato sauce.

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### Danish fishery fair

An international fishery trade fair is to be held in Copenhagen from May 18 to 27. It will be accommodated in the Forum building and also at the harbour at Sydhavnen and is said to be the first of its kind to take place in Scandinavia. Exhibits will include fish canning, fish oil rendering, fish meal manufacture and packaging materials. The fair is organised by International Fishery Trade Fair, 10, Puggaardsgade Copenhagen v.

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### Better Food Exhibition

A "Better Food Exhibition," the second of its kind was held recently in Melbourne, the capital of Victoria, by the Food Technology Association. Seventy-three firms exhibited. The Minister for Trade, Mr. J. McEwen, revealed when opening the exhibition, that the food processing industry had earned Australia £A50 million in export income last year.

Victoria is the main food processing state in Australia, half the processing of dairy products and over 40% of fruit and vegetable canning, including jam making, being done there. Of the total employment in manufacturing industries in Victoria 27% is in food processing.

In the year 1954-55, Victoria produced 178 million lb. of canned fruits and vegetables, 4 million gal. of tomato juice, sauce and soup, 127 million lb. of processed whole milk, 20,000 tons of cheese, 4 million gal. of ice-cream, 42 million lb. of biscuits, 52 million lb. of confectionery and 41 million lb. of jam.

Some of the exhibits at Melbourne were by firms which have recently expanded their activities in Victoria, including H. J. Heinz Pty. Ltd. and Kraft Foods Ltd.

Forty companies and organisations contributed to the complex job of setting up the canning line exhibit. It gave some indication of the development of the food canning industry in Australia where some processing lines operate at speeds up to 400 cans per min. The line turned out 10,000 4 oz. plum puddings a day from a special "exhibition mixture."

**Mixing plum pudding at the Melbourne "Better Food" exhibition.**

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### Antibiotic-treated meat

Two American scientists have left for Australia and New Zealand to study the effect of treating beef, lamb and mutton shipments with antibiotics to prevent spoilage during the 10,000 mile journey to Britain. The effects of the treatment will be studied by the scientists, with British experts in London.

The two are Dr. F. Deatherage, chairman of the Department of Agricultural Chemistry at Ohio State University and Mr. J. Pfeiffer of the American Cyanamid Co. The base of the process is "acronise," containing a special food grade of aureomycin.

### Americans eating more meat

Meat output in 1955 in the U.S.A. soared to a new record volume of 26.8 billion lb. according to J. Morrell Foster, chairman of the board of the American Meat Institute. "Even more remarkable" he added, "is the fact that the consuming public ate this tremendous production and thus cleared the way for the even bigger 27.2 billion lb. predicted for 1956, with no heavy stocks hanging over the market as in so many other farm commodities."

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### Fruit juice congress

The 4th International Congress of Fruit Juices is to be held in Stuttgart from May 28 to June 3, in the Killesberg Park. The congress will include the 2nd German Congress of fruit juices and fruit juice beverages and the international exhibition "Liquid Fruit."

Papers to be read will include treatises on the microbiology, technology, bottling and packaging, standardisation and advertising of fruit juices. Dr. V. L. S. Charley, director of Ribena Ltd., who is the only British speaker, will read a paper on "Fruit juices in modern nutrition." Dr. Charley is the author of *The Principles and Practice of Cider Making* and *Cider Factory Plant and Layout*, both published by Leonard Hill Limited.

# Food Packaging

### Blind end tubes

Collapsible tubes supplied with "blind end" aluminium nozzles and fitted with spike caps are being offered by Betts and Co. Ltd. When ready for use the aluminium membrane covering the open end of the tube is pierced by a spike on the cap. It is said that the tubes save about 3d. per gross and are particularly attractive for the food industry where it is essential that tubes remain hermetically sealed until the consumer wishes to open them.

The cap has a dual feature, bearing not only the spike for piercing the orifice before use but an internal ring which is claimed to give a perfect seal when the tube is opened and a good grip on the aluminium so that is does not rattle loose. It is known as the *Kapavee*.

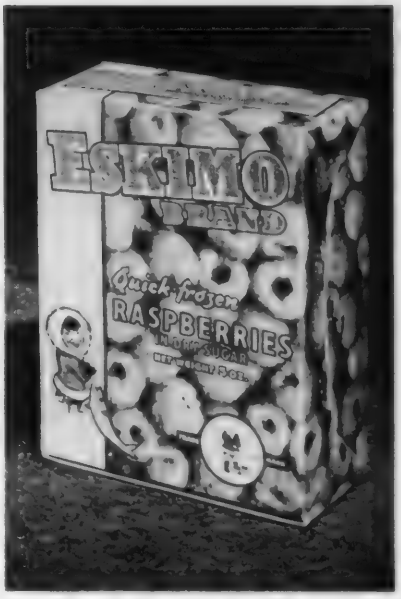
While the design of the tube is a reproduction of the one already sold in the U.S. this is said to be the first time the tube has been offered to British manufacturers. The idea of the internal ring is already in use with alternative cap forms in Europe. However, an ordinary moulded plug-type cap is used there which is kept away from the blind end by a collar which is thrown away when the user wishes to pierce the tube, the plug forming its own seal. This can also be supplied in this country.

The open end of the tube can be hermetically sealed by an internal coating which protects the metal from the contents of the tube and hermetically seals when crimped in the filling and closing machine. Where this coating is not required, special end sealing bands are applied on plain metal in other internal lacquers such as latex or vinyl etc., so that the same tight closure is obtained.

### Zip-open containers

The "zip-opening" type of container is rapidly gaining in popularity in this country and many corrugated and fibreboard container manufacturers are using the idea. However, a surprisingly large number of users in this country cancel out the effect of this innovation by printing the words "pull to open" in only very small type on the side of the case. In many cases it is quite easy for the customer to miss the instruction altogether and to continue opening the container with a knife. To avoid mistakes the instruction should be printed as boldly as possible.

**1. Two sizes of the "blind end" aluminium tubes. 2. Piercing the blind end. 3. After piercing. 4. Open end of the tube showing the internal coating. In this case it is a heavy one—50 mg. per sq. in. of a special wax.**




**New 5 oz. fruit and vegetable pack for Grimsby Frozen Products Ltd. This new pack, which was designed and produced by the Metal Box Co. Ltd., has a full colour panel showing the product in the carton. The carton also features the laughing "Eskimo" boy which is now a trade mark of Grimsby Frozen Products.**

### "Peel off" can tops

A can top which can be "peeled off" the body of the can has been patented in America. It is described as an improved top structure for metal cans which provides easy access to the contents without using an opener or key. The can cover is formed of several layers of thin, metal luminar sheets joined together at their peripheral portions by an annular layer of solder. A layer of solder is provided around the periphery. The cover is provided with a metal tab so that it can be "peeled" back.

### New polythene film

Vitaloid Products (Manchester) Ltd., makers of *Vitaseal* and *Vitashield* gummed tapes, have formed a new division to market an advanced type of polythene film ideal for the packing and protection of goods. The new material *Flexothene* has a guaranteed consistent gauge, is practically non-static and has permanent ink adhesion for excellent colour printing. It is obtainable plain or printed as film, layflat tubing, bags and as laminations with a variety of other packaging materials.

An illustrated folder giving full details has just been issued and may be obtained together with samples of all types of *Flexothene* from the Flexothene Division of Vitaloid Products (Manchester) Ltd., London, S.W.1

# New Companies

**Brambles (Packers), Ltd.** (558545.) Buyers, sellers, packers and distributors of foods, etc. £100. Subs.: P. F. Ralfs and J. E. Phillips, 11, Old Jewry, London, E.C.2.

**S. Way and Sons, Ltd.** (550192.) 12, Grants Walk, St. Austell, Cornwall. Bakers and confectioners, dairymen, etc. £4,000. Dirs.: S. and Mrs. K. M. Way, S. D. and F. Way.

**Cake Mix Co. (Manchester), Ltd.** (550316.) Mfrs. and retailers of mixes for cakes, puddings, etc. £100. Dir.: B. Hood, Red Roof, Ladythorn Road, Bramhall, Cheshire.

**Peter Champeney, Ltd.** (550634.) Midland Bank Chambers, High Street, Weston-super-Mare. Mfrs. and distillers of and dealers in beer, wines, spirits, cider and mineral and aerated waters. £500. Dirs.: C. J. and Mrs. I. E. Champeney.

**Apollo Productions (Gt. Britain), Ltd.** (550151.) Mfrs., bottlers, merchants of and dealers in aerated and mineral waters, fruit juices, wines, cordials, etc. £100. Subs.: J. A. Farr, Worksop Manor, Notts, F. Marsden.

**Cherryfield Brand Meats (Worthing), Ltd.** (553546.) 44, Cherry Orchard Road, Croydon, Surrey. £1,000. Dirs.: T. P. and W. J. Coughlan.

**Kingston Deep Sea, Ltd.** (553154.) To catch, freeze, store, salt, smoke, cure and preserve fish or fish products, etc. £100. Subs.: L. D. Greaby, 255, Westbourne Ave., Hull, and B. B. Smart.

**Potters (Bottlers and Packers), Ltd.** (553285.) 180, George Lane, London, E.18. £5,000. Dirs.: C. R. Potter and I. F. Stockell.

**Smarden Fruit Juices, Ltd.** (553108.) 15, Great James Street, London, W.C.1. Mfrs., bottlers and producers of and dealers in mineral and aerated waters, cordials, etc. £1,000. Dirs.: J. R. Vallin and C. Elman.

**Carlyon Confectionery, Ltd.** (558812.) 1, Sydney Road, Cradley Heath, Staffs. £1,000. Dirs.: W. J. R. and Barbara Tregear.

**Fairmile Food Products, Ltd.** (558818.) £100. Dir.: Kathleen J. Slade. Subs.: P. O. Ansell and A. Matthews, 116, Chancery Lane, London, W.C.2.

**Cereals Committee, Ltd.** (558386.) To investigate and diffuse information concerning the trade or business of purchasing, importing, storing and selling wheat and other cereals and manufacturing and merchandising flour and other cereal products, and to conduct such enquiries at the request of or in collaboration with the National Association of British and Irish Millers and the National Federation of Corn Trades Associations, etc. Subs.: Diana M. Holland and K. G. Allison, 47, Morpeth Mansions, Morpeth Terrace, London, S.W.1.

**Jules Ices, Ltd.** (560736.) 13, Mansfield Street, London, W.1. Mfrs. of and dealers in confectionery, ice cream, etc. £100. Dirs.: S. Fear and J. Brooks.

**H. F. Henstock, Ltd.** (560904.) 11, Clarendon Street, Coventry. Confectioners, mfrs. of and dealers in chocolates, ice cream, mineral waters, etc. £5,000. Dirs.: H. E. and Mrs. E. L. Henstock, L. G. Riddle.

*From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.*

# The Leonard Hill Technical Group this month

**Dairy Engineering.** — Boras Central Dairy; The Dairy Industry in France; World Trade in Dairy Produce; British Dairy Equipment in Action Overseas; Functions of the Food and Drugs Sampling Officer.

**Manufacturing Chemist.** — Boot's new Cortisone Plant; Solubilisation with Amphiphilic Compounds, 2; Radiochemistry Laboratory; Progress Reports: Cosmetics and Toilet Preparations, Fertilisers and Plant Nutrients, Antibiotics; B.I.F. Review.

**World Crops.**—Advanced Designs in Land Clearing Equipment; Problems of Reclaiming certain Infertile Areas in the Sudan Zone of Northern Nigeria; Farming from the Air—American Experience; Progress in the French Wine Growing Industry; Alternatives to Superphosphate.

**Corrosion Technology.**—Calcium Plumbate in Anti-Corrosive Paint Pigments; A Scheme for the Examination of Corroded Metal Specimens; Corrosion Problems on the Texas Gulf Coast, 1; Plastic Pipes; Low-Temperature Corrosion by Flue Gas Condensates, 3.

**Fibres.**—Inhibitors to Gas Fading for Coloured Acetate Goods; The Vieluba Meter for Measuring Thread Regularity; Resin Bonding of Hardwood Fibres in Offset Papers.

**Chemical and Process Engineering.**—Catalysis; Graphical Design Calculations for Extraction with Reflux; Superphosphate Manufacture in Russia; The Atomisation and Spraying of Liquids in Industry; The World's First Fully-Integrated Aluminium Plant.

**Paint Manufacture.**—The Fundamentals of Colour; Stearates for the Paint Industry, 2; Will Aerosol Packages Stay? Mechanical Handling for Packaging.

**Building Materials.** — The Architectural Use of Building Materials; Materials Used in new Technical High School; Developments in the Application of Concrete to Housing; New Materials for Brick Making.

**Muck Shifter.**—The Construction of a Great Earth Filled Dam; Handling Coal Sludge Deposits; Tin Dredging in S.E. Asia; Drilling in a Lead Mine.

# Trade Marks

APPLICATIONS

**EVELITA.**—742,904. Wines. **The Real Companhia Vinicola do Norte de Portugal** (a joint stock company under the laws of Portugal), Villa Nova de Gaia, Oporto, Portugal; Manufacturers and merchants.

**CAMROSA.**—740,190. Canned fruit, canned vegetables and canned meat. **Hanworth Food Products, Ltd.,** 22a, College Hill, London, E.C.4; Manufacturers.

**ALBANIX.**—740,984. Edible fats and edible oils. **Percy and Halden (Edible Products), Ltd.,** 54, Admiral Street, Glasgow, S.1, Lanarkshire.

**RED BOY.**—741,291. Cheese. **David Davidson, Ltd.,** 17 and 19, Umberston Street, London, E.1; Manufacturers and merchants.

**SNOW WHITE.**—720,875. Flour for sale in Yorkshire, Durham and Northumberland. **E. B. Bradshaw and Sons, Ltd.,** Bell Mills, Skerne Road, Driffield, East Yorks; Manufacturers.

**SORBICHOC.**—736,301. Chocolate in bar, powder or filamentary form, chocolate croquettes and chocolates. **Ringers' Cacao and Chocoladefabrieken N.V.** (organised under the laws of Holland), Noorderkade 27, Alkmaar, Holland; Manufacturers and merchants.

**KOOLA-FRUTA.**—B739,327. Ice cream confections, ice cream and water ices, all being fruit flavoured. **Glacier Foods, Ltd.,** Industrial Estate, Maidenhead, Berks; Manufacturers and merchants.

**KOOLA-KREEMA.**—B739,328. Ice cream confections, ice cream and water ices. **Glacier Foods, Ltd.,** Industrial Estate, Maidenhead, Berks; Merchants and manufacturers.

**SIMON THE CELLARER.**—739,366. Meat, fish, poultry and game; preserved, dried and cooked fruits and vegetables, and meat extracts, jellies, jams, eggs, milk, dairy products, edible oils, edible fats, pickles, soups, soup powders and soup tablets; and 739,367. Meat pies, meat and egg pies, coffee, tea, cocoa, sugar, rice, tapioca, sago, bread, biscuits, cakes, pastry, non-medicated confectionery, ices, condiments and sauces; and 739,368. Beer, ale, stout and porter and non-alcoholic drinks and preparations for making such drinks. **Mitchells and Butlers, Ltd.,** Cape Hill Brewery, Birmingham; Brewers, bottlers and wine and spirit merchants.

**MILL BRAND.**—705,747. Tinned meats, soups, pickles, salad cream and oil, jams and canned fish. **Tieleman and Dros C.V.,** Middelstegracht 97, Leiden, Holland, c/o Haseltine, Lake and Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

**DANILARD.**—733,393. Edible lard. **Eksport-Svineslagteriernes Salgsforening,** Axelborg, Copenhagen, v. Denmark, c/o O'Donell, Livsey and Co., 47, Victoria Street, London, S.W.1.

**DUNIM**—744,146 and **DUNOX.**—744,147. Canned fish. **Duncan, Fox and Co., Ltd.,** 144 Leadenhall Street, London, E.C.3.

**LIGHTHOUSE.**—745,354. Shrimps, lobsters, mussels, sardines, herrings, caviar, fishballs, smoked mackerel, anchovies and pickled sprats, all being canned goods. **A. B. Sveriges Forenade Konservfabriker,** Stora Nygatan 17, Goteborg, Sweden, c/o T. B. Browne, Ltd., 117, Piccadilly, London, W.1.

# Information and Advice

**This Service is available to subscribers to Food Manufacture. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.**

### Frozen salted egg yolk

B.7758. *Is it possible to retain an egg yolk/salt mixture in cold storage in the same way as an egg yolk/sugar mixture? The ultimate use for the egg yolk would be in salad cream, and it is essential that the egg yolk should not be denatured.* (Dublin)

You will find some references to the mixture of salted egg yolk in Food Investigation Special Report No. 60, *Eggs and Egg Products*.

Large quantities of the product are manufactured in the U.S.A. and elsewhere: the mixture usually contains 10% of added salt. After dissolving the salt in the liquid yolk, the mixture is frozen rapidly and stored in the frozen state. Frozen egg products are usually transported to this country and stored here at a temperature of about 14°F.

The freezing and thawing of egg yolk normally produces a very large increase in viscosity. Presumably this is what you have in mind when you mention denaturation. The increase in viscosity can be prevented or greatly diminished by dissolving certain compounds in the yolk before freezing. The two most commonly used compounds are sucrose and salt (at concentrations of 10%). Frozen salted yolk, properly prepared and stored, is a stable article of commerce.

### Repackaging olives

B.7718. *Can you give me any information about the repackaging of olives in brine into glass containers?* (Manchester)

Cover the olives with a 2·5-3·0% brine; exhaust the bottles at 160°F. before sealing and then retort at 240°F. for 1 hr.

### Salmon paste

B.7772. *We are interested in the manufacture of salmon paste in a small way. Have you any recipes?* (Silsden, Yorks.)

The following recipe can be used as a basis for experiment:

| | Parts | |
|---|---|---|
| Tinned pink salmon .. .. | 141 | (70·5%) |
| Bacon fat .. .. .. | 7·5 | |
| Finest rusk .. .. .. | 20 | |
| Water* .. .. .. .. | 30 | |
| Pepper .. .. .. .. | 0·5 | |
| Mace .. .. .. .. | 1 | |
| Pink colour .. .. .. | Trace | |

* This may be soup stock or a 5% solution of gelatine.

Mix the ingredients well, except the rusk, and pass them through the fine plate of a mincing machine. Before this, mix the rusk with water or soup stock. Then intimately mix the total ingredients and fill the homogeneous paste into jars sealed with a *Phœnix* cap.

Carry out the usual sterilisation at 240°F., the time depending on the size of the pack.

### Cheese straws

B.7609. *Can you give us any information on the manufacture of cheese straws?* (Patrington, Yorkshire)

We suggest that you try this recipe:

| | |
|---|---|
| Soft flour .. .. .. .. | 17½ lb. |
| Scone flour .. .. .. .. | 2½ ,, |
| Butter or compound fat .. .. | 10 ,, |
| Grated cheese .. .. .. | 2½ ,, |
| Salt .. .. .. .. .. | 2½ oz. |

White pepper or other seasoning to taste.

Make a dough with the above ingredients and water and pass through an extruder. Cut into the required lengths and bake in a sharp oven. Should an extruding machine not be available the dough may be rolled out fairly thin and cut into narrow finger forms; the lengths may also be twisted if desired.

### Information supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery and materials, and also general information as follows:

B.7697. *Information on German double-screw meat mincing machine.* (Swansea)

B.7699. *Information on tomato peeling machine.* (Manchester)

B.7700. *Suppliers of machinery for roasting and salting peanuts.* (Grimsby)

B.7701. *Suppliers of blackcurrant juice.* (New York)

B.7702. *Information on use of invert sugar in cream paste.* (Slough, Bucks.)

B.7705. *Information on manufacture of candied fruit.* (Rickhill, Co. Armagh)

B.7706. *Advice on packing deep frozen fish.* (Swansea)

B.7707. *Information on packaging machines for biscuits.* London, E.13)

B.7708. *Suppliers of equipment for making yeast.* (Göteborg, Sweden)

B.7709. *Suppliers of white edible shellac.* (Sheffield)

B.7710. *Literature on mayonnaise and salad cream.* (Bombay)

B.7711. *Makers of wide range moisture meters.* (Bergen, Norway)

B.7712. *Method of making malt compound non-hygroscopic.* (Hyde, Cheshire)

B.7714. *Suppliers of food mixer.* (Blackrock, Co. Dublin)

B.7715. *Information on cashew nuts.* (London, S.E.5)

B.7716. *Makers of hydrostatic steriliser.* (Nebraska, U.S.A.)

B.7717. *Recipes for bakery creams.* (North Shields)

B.7718. *Advice on packaging olives in brine and formula for piping jelly.* (Manchester)

# Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

746,850. F. THEEGARTEN. Apparatus for moulding and packing bon-bons.
746,859. UNILEVER, LTD. Food products.
746,787. GENERAL FOODS CORPORATION. Production of quick-cooking rice.
746,675. T. HUNTER, LTD. Closure of bottles and similar containers.
747,022. ROSE KIST FOODS, INC. Packaged popcorn kernels and method and apparatus for packaging same.
747,117. R. G. T. BAADER. Filleting of fish.
742,217. H. L. RICARD. Process of manufacturing cocoa and chocolate pastes.
747,053. INTERNATIONAL MINERALS AND CHEMICAL CORP. Treating uncooked flesh of fowl.

ABSTRACTS OF BRITISH PATENTS

**Ice cream manufacture**

Portions of an ice cream mix are moved over hollow refrigerant-containing members arranged in such a way that the severed portions follow a vertically extending spiral path from an inlet to a discharge point.—740,831. *Eskimo Pie Corporation.*

**Process cheese**

In the manufacture of melted cheese alkali metal acid salts, alkaline earth metal acid salts, organic acid salts or their mixtures, of tripolyphosphoric acid, containing 82·55% of phosphorus pentoxide are used as flux agents. Semi-green and green melted cheeses can be manufactured by this process.—738,151. *Italcolloid Soc. Per Azioni.*

**Fish skinning machine**

Any variation in the thickness of skin, which is removed by a knife and passes between resiliently loaded fluted pressure rollers, is transmitted to the knife, to adjust it relative to a feed plate, by a movable one of such rollers.—741,799. *N. Andreassen.*

**Bread and cake production**

A method of making a culinary mix which can be baked into cakes, biscuits, bread, etc., comprises mixing the flour with atomised shortening in a liquid, supercooled condition.—740,958. *General Foods Corporation.*

**Pudding compositions**

A composition for the instant preparation of a pudding by reaction with milk protein comprises a tetra-alkali pyrophosphate, an alkali orthophosphate and a pre-gelatinised starch.—741,076. *General Foods Corporation.*

**Ice-making machine**

A vertical tubular machine has groups of freezing pipes which are operated in succession so that all but one group are in the freezing phase. The groups are arranged between common upper and lower headers which are connected by a return pipe, circulation being under pressure from the top header *via* valves which are controlled by links actuated simultaneously with and by a rotatable distributor. The latter controls communication of all groups, except one, with cells in the bottom header.—743,061. *G. Trepaud.*

**Cakes**

A piston ejects jam, etc., from a container nozzle by the action of pushing a doughnut, etc., over such nozzle.—736,739. *S. A. Jones.*

**Poultry stripping**

A plucked bird is dipped in a waxy substance and is then finished in a machine of the kind having flexible fingers, the stubble, etc., being removed with the wax, which is collected for re-use.—741,977. *Cope, Whelon and Co., Ltd.*

**Citrus fruit peeler**

A peeling device for oranges, grapefruit, etc., includes a body portion with runners to contact the outer surface of the fruit, resilient mounting means for a peel cutting device, and a peel cutting device formed by a blade which carries at its free end side-ways projections to engage the underside of the peel. The resilient mounting means pull the projections and the portions of peel engaged thereby away from the centre of the fruit.—737,894. *J. Levitin.*

**Drying, baking, roasting, etc.**

A process of roasting, baking, etc., of foodstuffs employs hot effluent gases from the treating zone containing oxidisable fumes which are passed through a catalytic oxidation zone to completely oxidise the fumes and are then recycled to the treating zone. The introduction of oxygen to the system is limited so that the treatment gas will not support combustion under the operating conditions.—741,900. *Oxy-Catalyst Inc.*

**Dough rolling machine**

A cluster of four rollers form a compression space with inlet and outlet gaps, two rollers being diagonally opposed across this space and rotating in the same direction, while a third counter-rotating roller defines such gaps between itself and the two rollers respectively. The fourth roller can be driven in either direction and is adjustable relative to the first roller to control the delivery of rolled material—741,632. *T. and T. Vicars, Ltd.*

**Beer pump coupling**

A hollow coupling member is of D-section externally and is clamped in a support bracket having relatively hinged jaws of corresponding internal cross-section. The jaws have an associated tightening screw.—741,624. *W. E. Gill.*

**Alginic products**

An alginate jelly (*e.g.* for artificial cherries) is prepared by reacting calcium alginate and a tri-basic alkali metal orthophosphate in the presence of water, introducing the product into an aqueous medium and gelling with a free acid, the gelling bath containing a sequestering salt for Ca ions.—741,990. *Alginate Industries, Ltd.*

**Cheese production**

Low-fat content milk is mixed with a starter, the mix set to coagulate the curds and form an acid mixture of curds and whey, the starter acting to promote an increase in the titratable acidity expressed as lactic acid. The curds and whey are separated while the mix has a *p*H in the range 4·5 to 4·8 and a titratable acidity of about 0·68% to 0·8% and whilst the compressibility (as defined) of the curds is at a maximum.—741,941. *De Laval Separator Co.*

**Bottle labelling machine**

The outer face of each label is rendered adhesive while held on a rotatable carrier, and a presser member contacts each label, in succession, on the non-adhesive side while on the carrier. A bottle, etc., is rolled over the label in contact with the presser member to apply the label.—741,147. *Rose Bros. (Gainsborough), Ltd.*

**Emptying milk churns**

An elevator in an apparatus for emptying milk churns into a tank comprises two endless chains supported apart by upper and lower sprockets and pulleys and having secured between them cross bars. These are so spaced that when a churn rests on one bar the one above it engages one of the sides of the churn. A churn is only engaged by the bars while it is elevated.—741,335. *United Dairies (Wholesale), Ltd.*

**Chocolate heat-treating apparatus**

Two counter-rotating, hollow, inter-engaging toothed cylinders are provided internally with heat exchange fluid. These change the temperature of material fed to the pinch of the cylinders and carried round between them and a hollow casing also containing heat-exchange fluid.—741,357. *Lesme, Ltd.*

**Synthetic sausage casings**

The adhesion of synthetic sausage skins, particularly those made from alginates, to the sausage content is improved by reversing the electric charge on the inside of the casings. This reversal is achieved using non-injurious solutions of cation-active compounds containing tri- or quadri-valent metal cations.—741,163. *Wolff and Co. K.G.*

*British abstracts are published by arrangement with the Technical Information Co., owners of the Patent Abstract Journal.*

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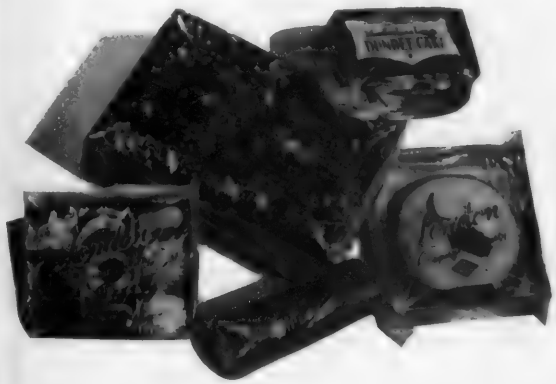

The LOMA METAL DETECTOR is ideally suited to the food industry and the above illustration shows a variety of nationally known food products on which it is being used. From the variation of shape and volume it will be seen that the "detecting head" can be designed to fit requirements.

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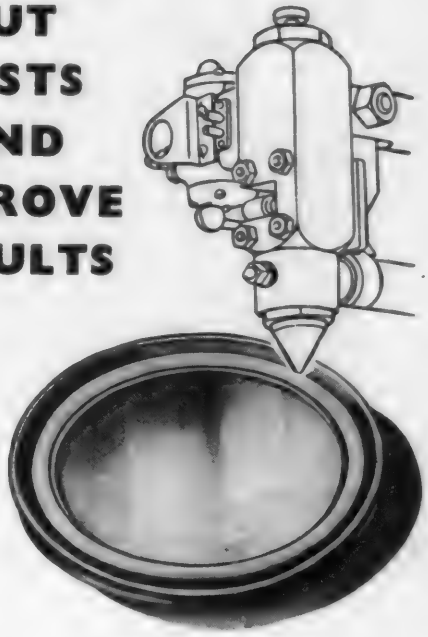

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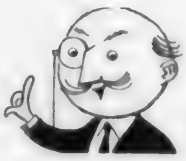

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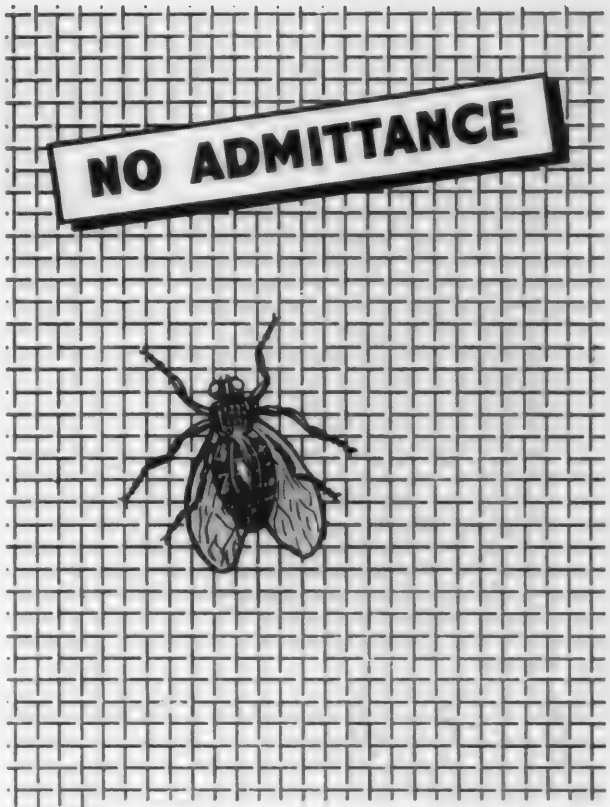


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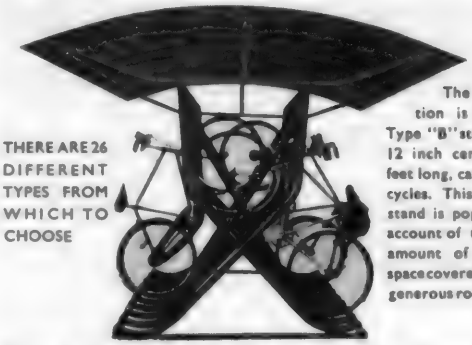

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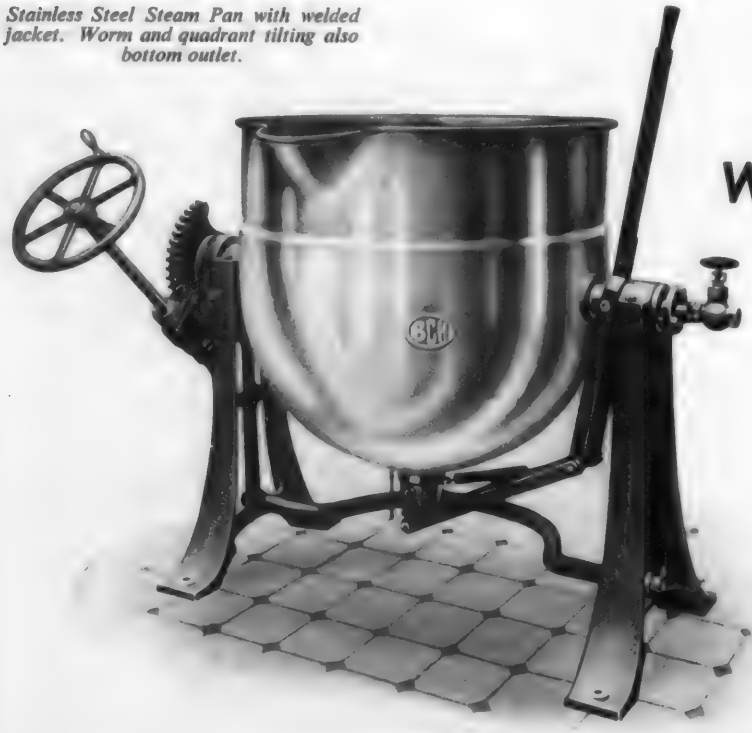

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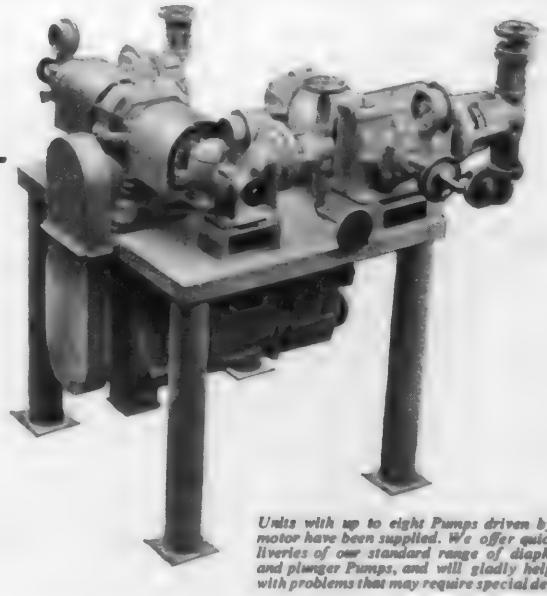

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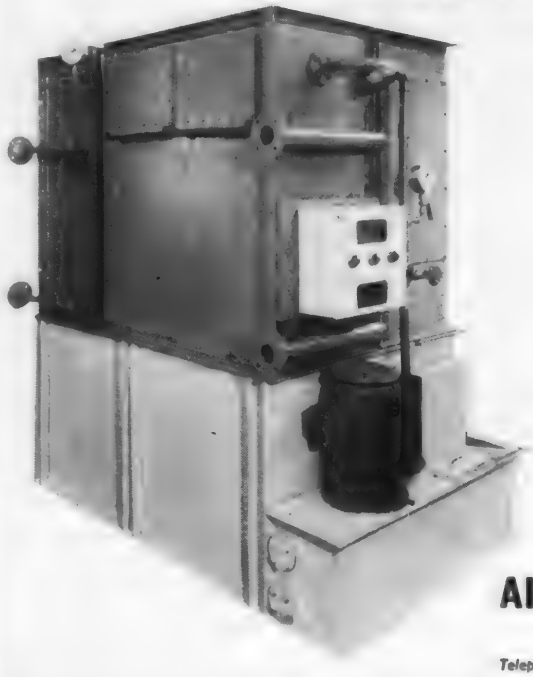

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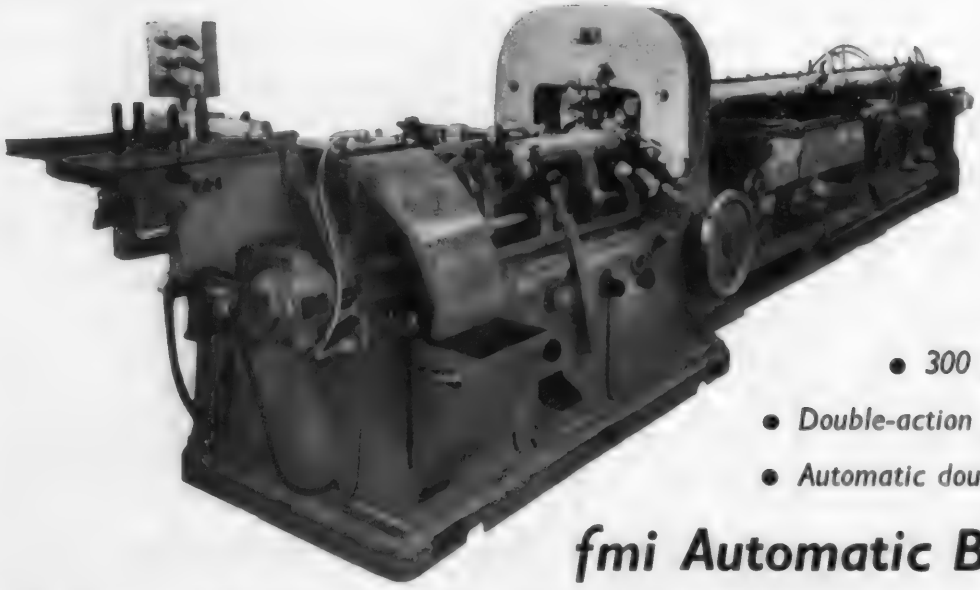

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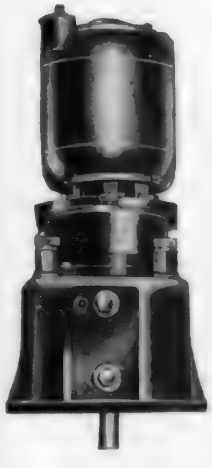

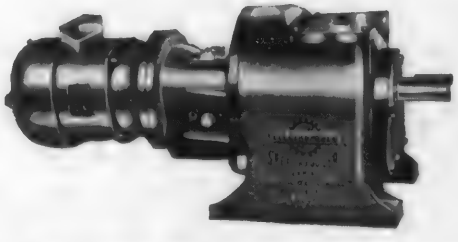

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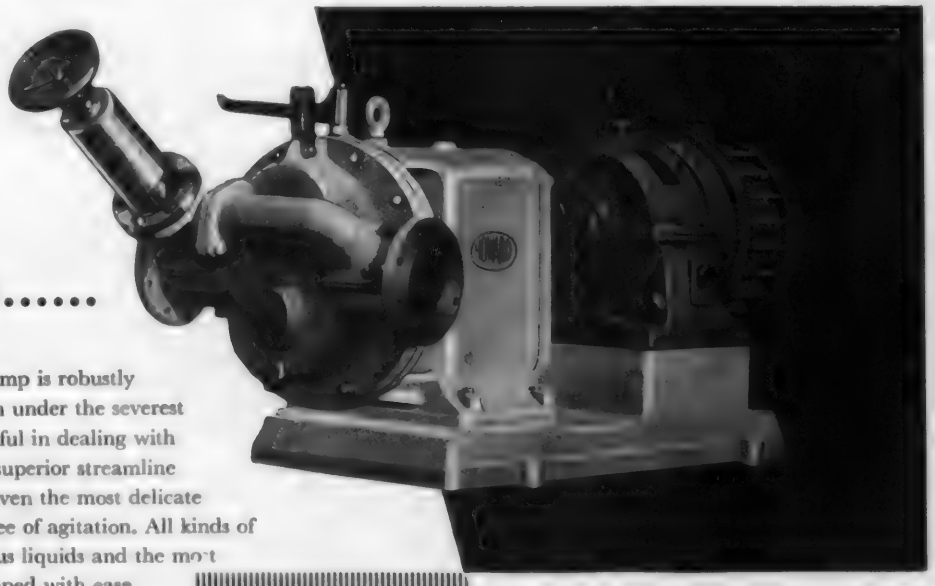

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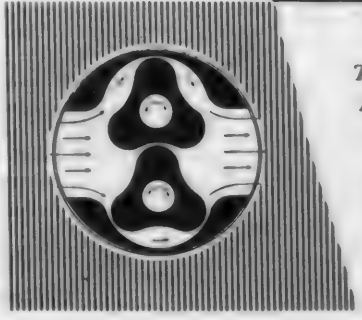

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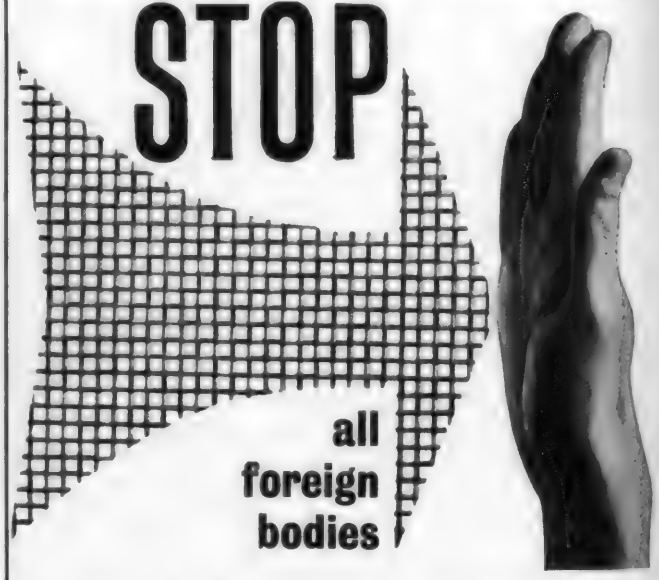

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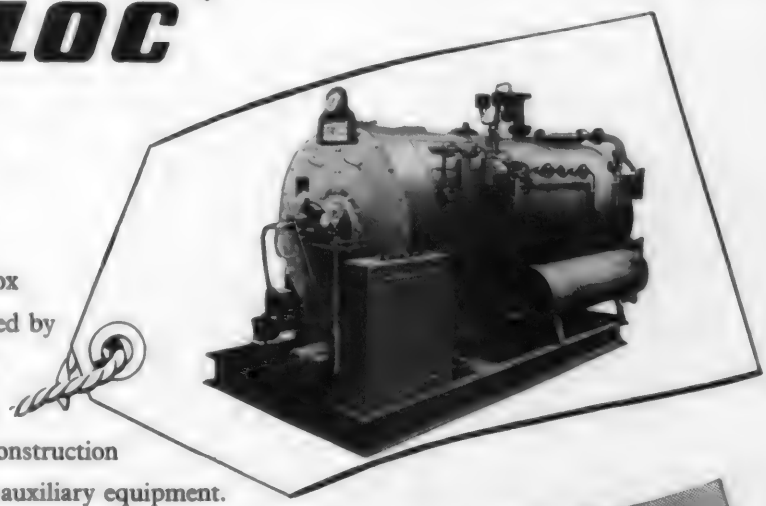

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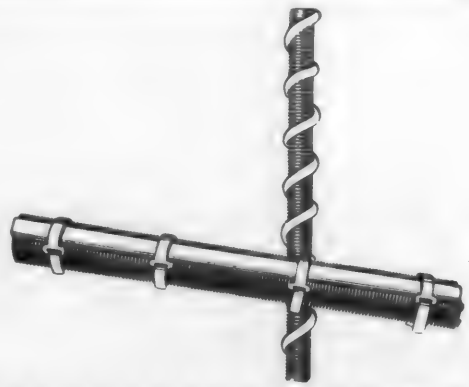

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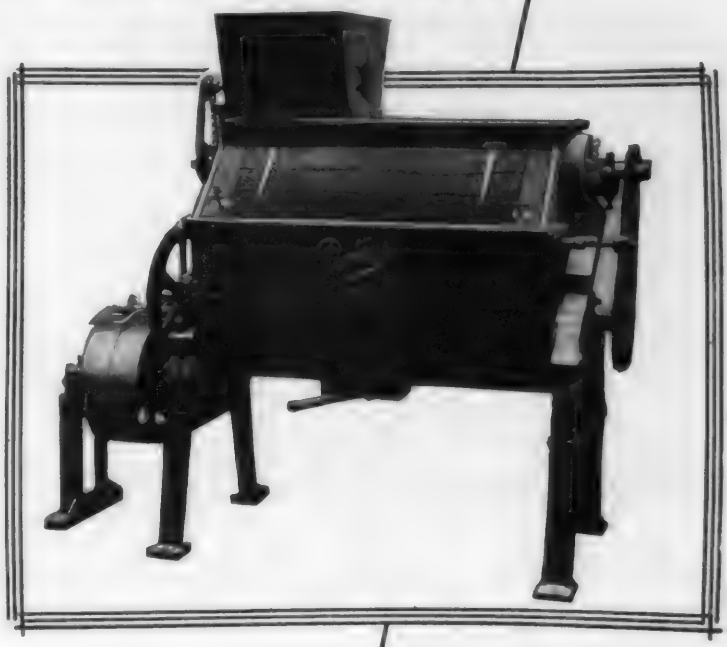

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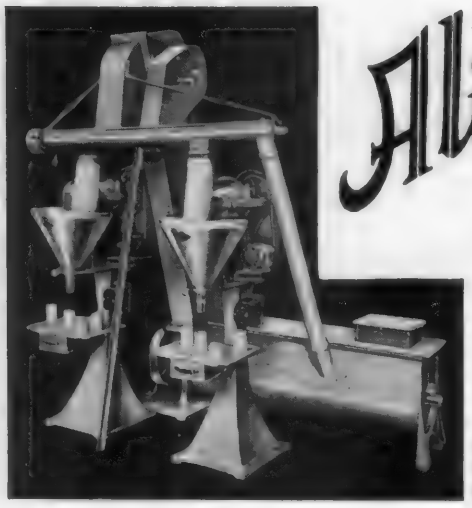

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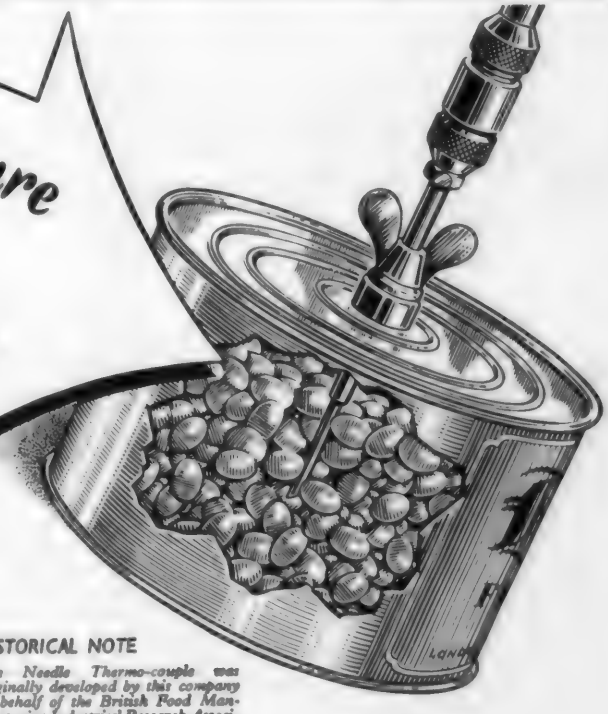

HISTORICAL NOTE

*The Needle Thermo-couple was originally developed by this company on behalf of the British Food Manufacturing Industries' Research Association for investigating heat penetration of canned foods in an autoclave.*

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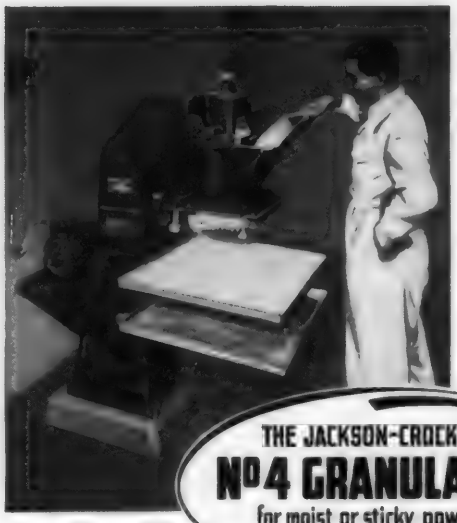

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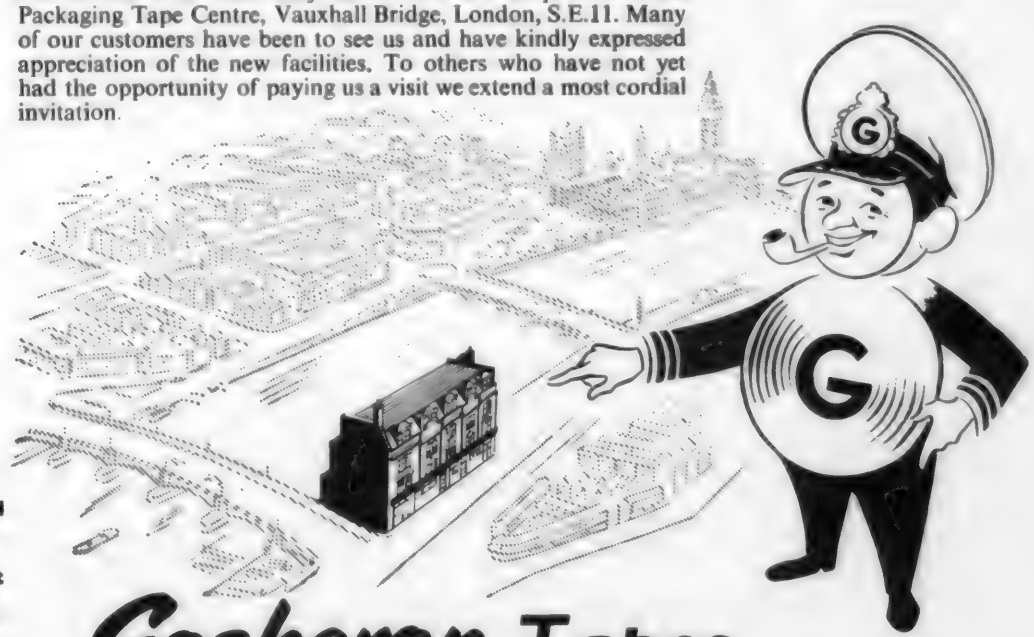


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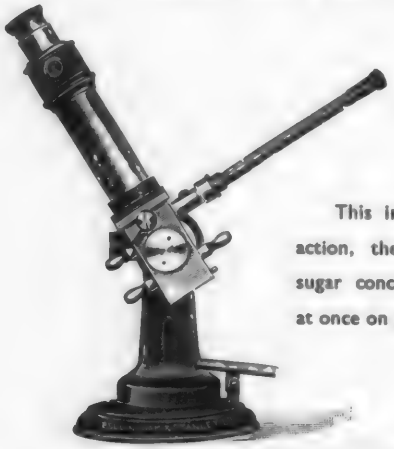

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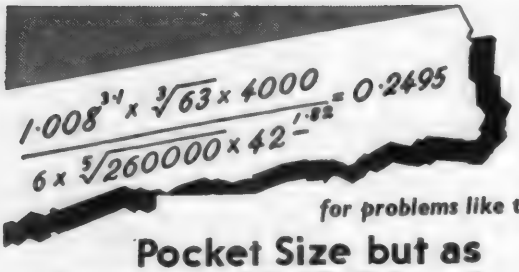


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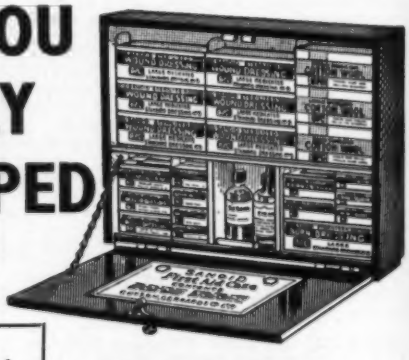

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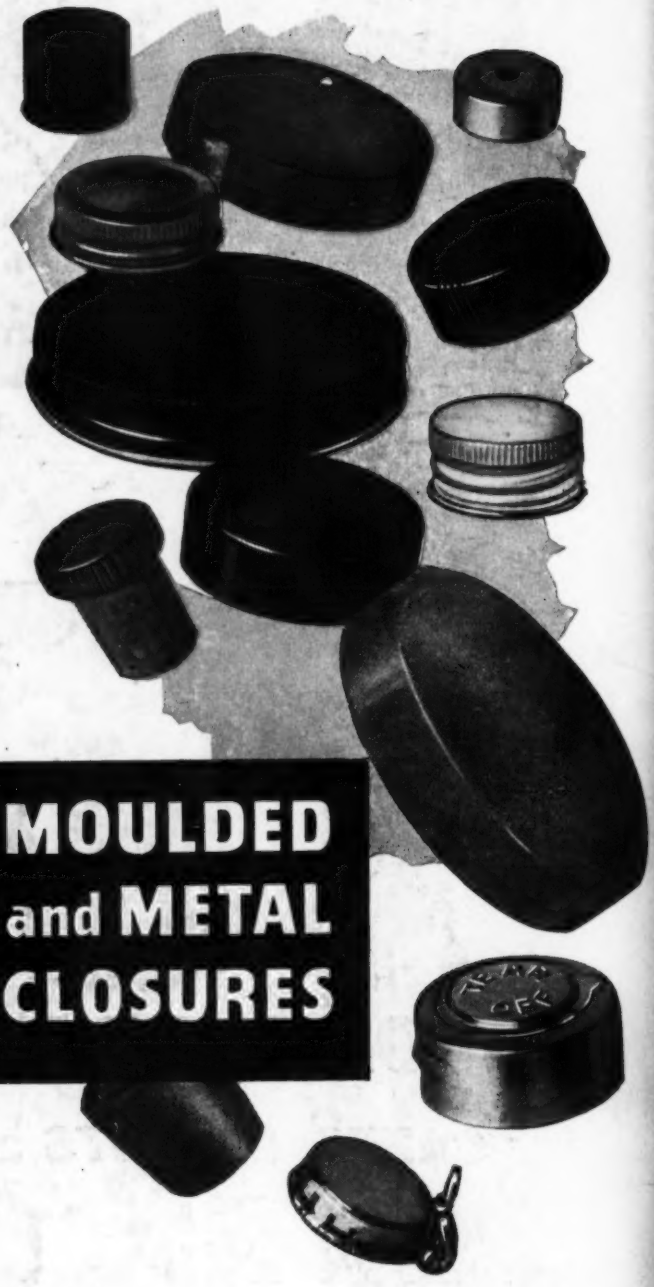

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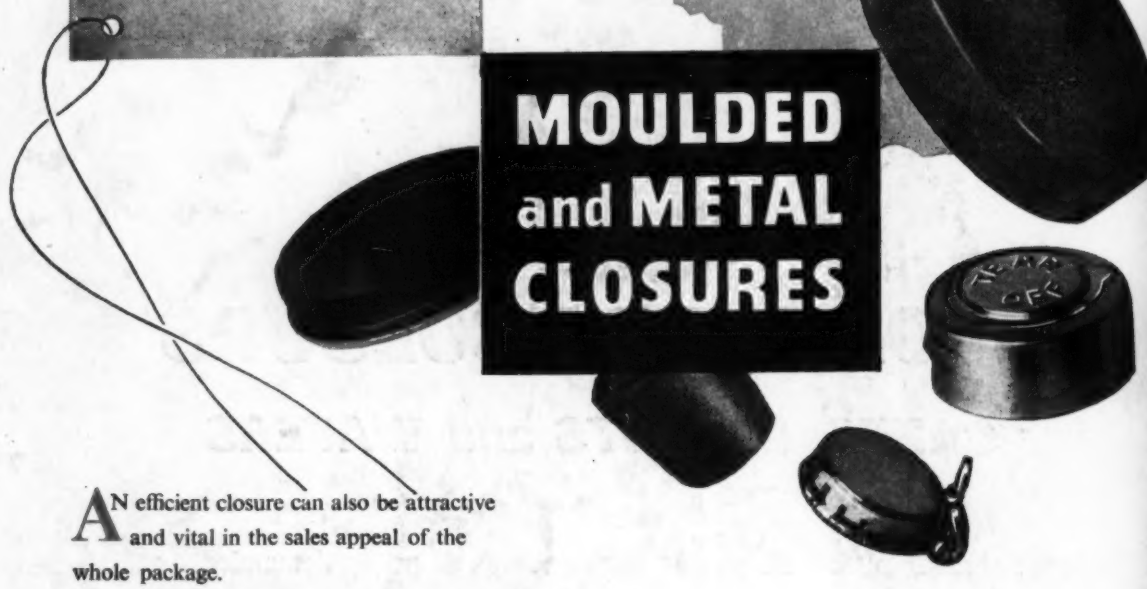

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